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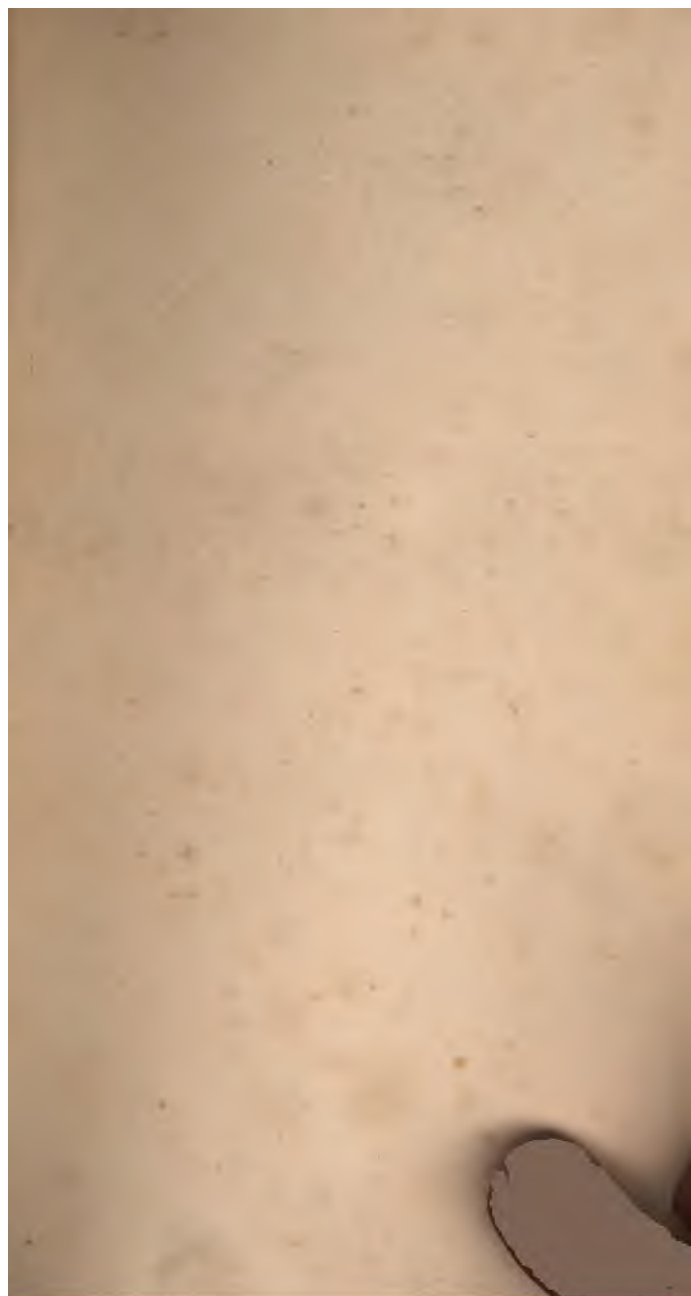
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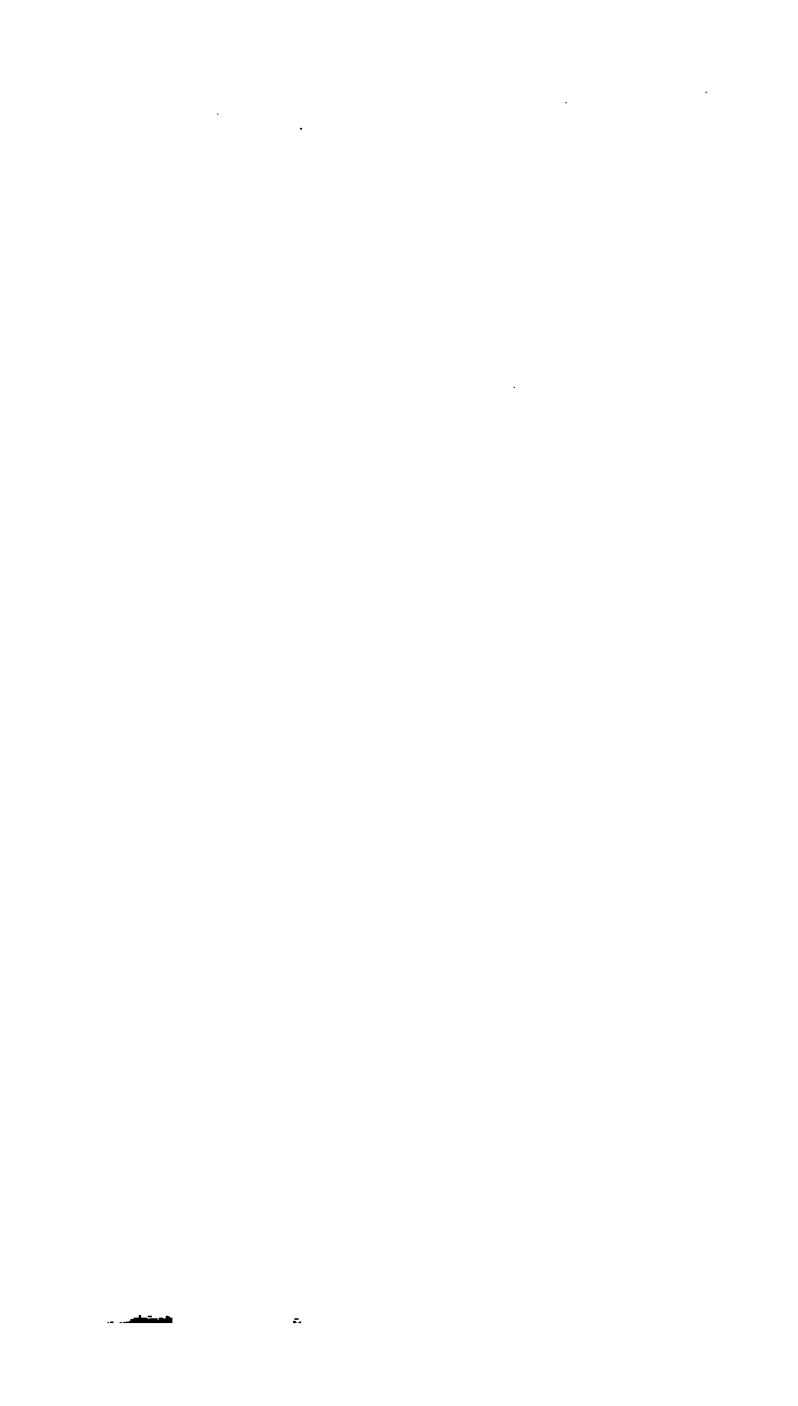




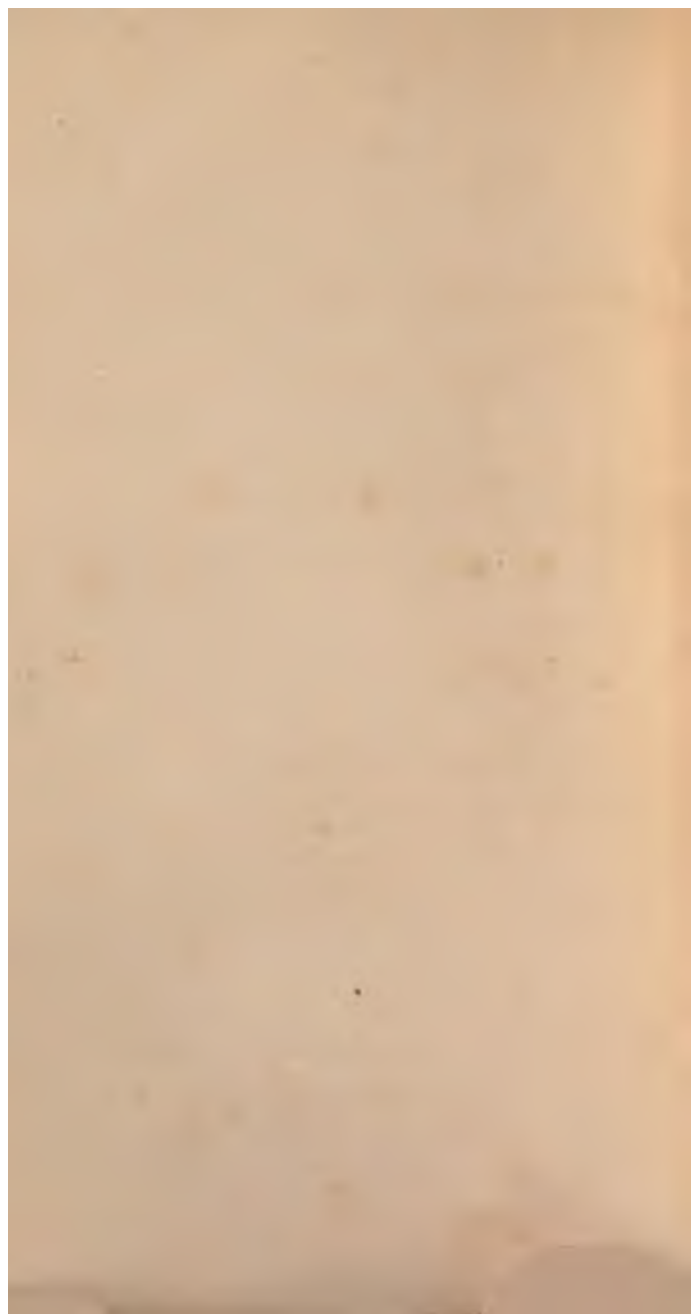
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A  
SYNOPSIS  
OF THE  
BONES, LIGAMENTS, MUSCLES,  
BLOOD-VESSELS,  
AND  
NERVES  
OF THE HUMAN BODY.

---

BY  
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IN BIRMINGHAM.

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BIRMINGHAM:  
J. C. BARLOW, BENNETT'S HILL;  
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1831.

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TO THE STUDENTS  
OF THE  
BIRMINGHAM SCHOOL OF MEDICINE.

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GENTLEMEN,

*In dedicating this little volume to you, I offer it as a tribute of gratitude for the kindness and partiality you have shewn towards me on all occasions as your Teacher. Accept it, also, as a testimony of my earnest zeal for the promotion of your studies, and more particularly of your advancement in the difficult science of Anatomy.*

*With most sincere wishes for your present welfare, and future prosperity in the honourable practice of your profession, believe me ever to remain*

*Your obliged, and faithful friend,*

WILLIAM SANDS COX.



## PREFACE.

THE following pages having been hastily arranged during my present course of Lectures, I fear many errors will be found in the composition ; but as my sole object has been to assist the student in retaining some of the principal points connected with the subjects on which they treat, I beg to claim every indulgence. I have availed myself especially of the works of Sœmmering, Meckel, Chaussier, Bichat, and the Lectures of Desault. Convinced of the accuracy and importance of the division and physiology of the nerves, discovered by Mr. Charles Bell, I have followed his views, and endeavoured to adopt a nomenclature in conformity with his system. My best acknowledgements are due to him for the very handsome and liberal manner in which he has allowed me to avail myself of his plates ; and to my colleague Dr. Eccles for many valuable suggestions, and for his kindness in examining the sheets in their progress through the press.

24, *Temple-row*,  
*April*, 22, 1831.





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## OF THE BONES.

---

ANATOMY is the science which teaches the fabric of the human body by an artificial dissection of its parts. Anatomy is divided into seven sections :

<i>Osteology</i>	A description of the bones
<i>Syndesmology</i>	of the ligaments
<i>Myology</i>	of the muscles
<i>Splanchnology</i>	of the viscera
<i>Adenology</i>	of the glands
<i>Angiology</i>	of the structure and course of the blood-vessels
<i>Neurology</i>	of the nerves.

The human body consists of solids and fluids. The solids are of different consistence, and therefore have been arranged under two heads, the hard and the soft. The first class comprehends the bones and the cartilages; and the second the muscles, viscera, nerves, and all other parts. The fluids form by far the largest proportion, and are divided into three classes: 1. the humors of absorption, or those destined to form the blood; 2. the blood itself; 3. the humors secreted.

The exact knowledge of the bones is the basis of the science; because, without this we cannot accurately understand the various connexions, situations, dispositions, and uses of the other component parts. The bones taken collectively bear the name of skeleton.



## THE BONES OF THE SKELETON.

The bones of the skeleton have been divided into those of the trunk, those of the head, and those of the extremities, and are two hundred and sixty-six in number. The bones of the head are sixty-eight in number, and have been arranged into those proper to the cranium, those of the face, and those common both to the cranium and face.

*The Bones of the Cranium are six in number:*

I vel II Os Frontis	II Ossa Temporum
II Ossa Parietalia	I Os Occipitis

*The Bones of the internal Ear are eight in number:*

II Mallei	II Stapedes
II Incudes	II Ossa Orbicularia

*The Bones common to the Cranium and Face are*

I Os Ethmöideum	I Os Sphenöideum
-----------------	------------------

*The Bones of the Face are fourteen in number:*

II Ossa Nasi	II Ossa Malarum
II Ossa Lacrymalia	II Ossa Turbinata inferiora
II Ossa Maxillaria superiora	I Maxilla inferior
II Ossa Palatina	I Vomer
XXXII Dentes	

*The Bones of the Tongue are five:*

V Ossa Lingualia

The trunk consists of the spine, thorax and pelvis, and is formed by fifty-eight bones.

*The Bones of the Spine and Thorax are fifty-one in number:*

VII Vertebrae Colli	V Vertebrae Lumborum
XII Vertebrae Dorsi	XXIV Costae
III Ossa Sterni	

*The Bones of the Pelvis are seven in number:*

II Ossa Innominata	I Sacrum
IV Ossa Coxalia	

The bones of the upper extremities have been divided into those of the shoulders, upper arms, fore arms, and hands, and are seventy-two in number.

*The Shoulders are composed of four Bones :*

II Claviculæ

II Scapulæ

*The Bones of the upper Arms are two in number :*

II Humeri

*The fore Arms are composed of four Bones :*

II Radii

II Ulnæ

The bones of the hands are sixty-four in number, and include the carpi, metacarpi, and phalanges.

*The Carpi contain sixteen Bones :*

II Ossa Navicularia

II Ossa Trapezia

II Ossa Lunata

II Ossa Trapezöidea

II Ossa Cunëiformia

II Ossa Magna

II Ossa Pisiformia

II Ossa Unciformia

*The Bones of the Metacarpi are ten in number :*

X Ossa Metacarpi.

*The Fingers comprise thirty-six Bones :*

X Phalanges anteriores

X Phalanges posteriores

VIII Phalanges mediæ

VIII Ossa sessamöidea

The bones of the inferior extremities have been subdivided into three classes, into the bones of the Thighs, Legs, and Feet, and are sixty-eight in number.

*The Thighs are composed of two Bones :*

II Ossa Femorum.

*The Bones of the Legs are six in number :*

II Fibulæ

II Tibiæ

II Patellæ

The bones of the Feet have been subdivided into those of the Tarsi, Metatarsi, and Phalanges.

*Fourteen Bones form the Tarsi :*

II Astragali	II Ossa cunëiformia externa
II Ossa Calcis	II Ossa cunëiformia media
II Ossa Navicularia	II Ossa cunëiformia interna
II Ossa cuböidea	

*The Bones of the Metatarsi are ten in number :*

X Ossa Metatarsi

*The Toes are formed by thirty-six Bones :*

X Phalanges posteriores	X Phalanges priores
VIII Phalanges mediæ	VIII Ossa sesamöidea

## THE OS FRONTIS.

The Os Frontis is divided into three portions ; the frontal, (*pars frontalis*), the orbital, (*pars orbitalis*), and nasal portion, (*pars nasalis*) ; into external and internal surface, (*superficies externa et interna*).

The external surface is smooth and convex. The frontal portion presents, in the middle line on either side, the frontal eminence, (*tuber frontale*), and beneath, an arched depression, (*tuber superciliare*), laterally a portion of the temporal fossa, (*fossa temporalis*). The orbital portion offers the superciliary margin, (*margo superciliaris*), the process for the tendon of the trochlearis muscle, (*spina trochlearis*), the orbital process, (*processus orbitalis*), the depression for lacrymal gland, (*fossa lacrymalis*), the external and internal angular processes, (*processus angularis internus et externus*), and between the orbitar processes, the ethmoidal fissure, (*incisura ethmoidalis*). The nasal portion offers, in the centre, the nasal spine (*spina nasalis*), and above is an eminence (*glabella*), indicating the situation of the frontal sinuses (*sinus frontales*). The internal surface is concave, and presents in the middle line the spine (*spina frontalis*), and a groove corresponding with the longitudinal sinus (*sulcus longitudinalis*), and on either side, depressions (*fossæ*) for the convolutions of the anterior lobes of the cerebrum.

The Foramina observable are three on each side on the external surface.

- Foramen supra orbitale* For the transmission of the supra-orbital nerve and artery.
- \**Foramen orbitale anterius* For the passage of the nasal twig of the first branch of the fifth pair and the anterior ethmoidal artery.
- \**Foramen orbitale posterius* For the transmission of the posterior ethmoidal artery and vein.

The internal foramen proper is the foramen cœcum ; in this a small process of the dura mater is lodged, and also a small vein passing into the superior longitudinal sinus.

#### Foramen cœcum.

*Connexions.*—It articulates with twelve bones: *above* with the parietal bones, *laterally* with the sphenoid, *below* with the nasal, lacrymal, superior maxillary and malar bones.

#### *Muscles arising from the Os Frontis.*

Temporales                      Orbiculares palpebrarum  
Corrugatores superciliarum

#### *Muscles inserted into the Os Frontis.*

Occipito-frontalis.

### OSSA PARIETALIA.

We may distinguish on each Os Parietale the following parts: an external and internal surface (*superficies externa et interna*) four borders (*quatuor margines*) and four angles (*quatuor anguli*.)

The external surface is convex, and presents in the

\* These Foramina are sometimes common to the frontal and ethmoid bones.

centre the parietal prominence (*tuber parietale*), and beneath an arched surface with radiated lines converging towards the inferior edge (*planum semicirculare*.) The four margins are, *anteriorly*, the frontal (*margo frontalis*), *posteriorly*, the occipital (*margo occipitalis*), *superiorly*, the sagittal (*margo sagittalis*), and *inferiorly*, the squamous (*margo squamosus*). The angles formed by the four borders may be thus enumerated, *superiorly and anteriorly*, the frontal angle (*angulus frontalis*), *superiorly and posteriorly* the occipital (*angulus occipitalis*) *inferiorly and anteriorly* the sphenoidal (*angulus sphenoidalis*) and *inferiorly and posteriorly* the mastoid (*angulus mastoideus*.)

The sphenoidal angle presents internally numerous deep furrows for the middle meningeal artery (*arteria meningeae media*), the mastoid angle internally, the depression for the lateral sinus (*sulcus sinus lateralis*), the occipital angle, externally the foramen parietale for the passage of a vein to the superior longitudinal sinus, also sometimes a small artery.

The internal surface is concave, and marked by the convolutions of the brain, and beneath the sagittal margin internally is observed the groove for the longitudinal sinus (*sulcus sinus longitudinalis*). *Connexions*, the parietal bones are connected to six bones, *anteriorly* with the frontal, *anteriorly and inferiorly*, with the sphenoid, *below*, with the temporal, *above*, with each other, and *posteriorly*, with the occipital bones.

### *Muscles arising from the Ossa Parietalia.*

#### Temporales.

## OS OCCIPITIS.

The Os Occipitis may be divided into three portions, the occipital (*pars occipitalis*), the condyloid (*partes condylöideæ*), and the basilar (*pars basilaris*). The occipital portion is of triangular shape, externally it presents the two transverse ridges (*spina transversa, superior et inferior*), the perpendicular spine and tube-

rosity (*tuber et spina occipitalis*): the internal surface is divided into four compartments (*fossæ*) by the crucial ridges (*spinæ cruciatæ*) in the two superior fossæ are lodged the posterior lobes of the cerebrum, in the two inferior, the posterior portions of the cerebellum, these ridges form grooves for the lateral and superior longitudinal sinuses (*sulci laterales et sulcus longitudinalis*.)

The lateral or condyloid portions are symmetrical, *inferiorly*, each portion offers the condyloid process (*processus condylöideus*), the anterior and posterior condyloid foramen (*foramen condylöideum anterius et posterius*), *laterally*, the jugular cavity (*foramen jugulare*), beyond this is a square eminence covered with cartilage, which is articulated to the temporal bone, and is named the jugular process (*processus jugularis*), and *internally* it assists in forming the foramen magnum.

The basilar portion is of wedge like shape, *anteriorly*, it joins the sphenoid, *posteriorly*, it assists in forming the foramen magnum, *laterally*, it offers irregular edges, and *superiorly*, it presents a concave surface (*fossa medullæ oblongatæ*).

The foramina consist of two pairs, a single one proper, and one pair common to it and the temporal bone.

*The pairs are,*

- |   |   |
|---|---|
| <i>Foramina condylö-idea anteriora</i>  | For the transmission of the ninth pair of nerves. |
| <i>Foramina condylö-idea posteriora</i> | For the passage of small veins and arteries       |

*The single one proper,*

- |                       |   |
|-----------------------|---|
| <i>Foramen magnum</i> | It gives passage to the medulla spinalis, with its membranes and vessels, the vertebral arteries, and accessory nerves. |
|-----------------------|---|

*The common Foramina are,*

- |                                     |  |
|-------------------------------------|--|
| <i>Foramina lacera basis cranii</i> | For the internal jugular veins, the pneumo-gastric and glosso-pharyngeal nerves. |
|-------------------------------------|--|

*Connexions.*—It is connected to six bones, *above*, with

the parietal, *anteriorly*, with the sphenoid, *laterally*, with the temporal bones, *inferiorly*, with the atlas.

*Muscles arising from the Os Occipitis.*

Occipito-frontalis	Constrictor pharyngis superior
Trapezii	

*Muscles inserted into the Os Occipitis.*

Sterno-cleido-mastöidei	Transversales capitis
Splenii capitis	Recti capitis antici majores
Complexi	Recti capitis antici minores
Recti capitis postici majores	Obliqui capitis superiores
Recti capitis postici minores	Constrictor pharyngis medius

## OSSA TEMPORUM.

Each Temporal Bone may be divided into petrous squamous, and mastoid portion, (*pars petrosa, squamosa, et mastöidea.*)

*Each Bone presents five Processes :*

<b>Processus auditivus</b>	Surrounding the meatus auditivus externus
<b>Processus mastöideus</b>	Gives attachment to the sterno-cleido mastöideus, splenius and trachelo mastöideus
<b>Processus stylöideus</b>	Gives attachment to the stylo-hyöideus, pharyngeus, and glossus muscles and stylo-hyöid ligament
<b>Processus zygomaticus</b>	Gives attachment to the temporal fascia and masseter
<b>Processus vaginatus</b>	Forms an articulating surface for the inferior maxilla

*Five Fossæ are observable.*

<b>Fossa digastrica</b>	Receives the digastric muscle
<b>Fossa parotidea</b>	Receives a portion of the parotid gland

<i>Fossa jugularis</i>	Receives the commencement of the internal jugular vein
<i>Fossa temporalis</i>	Receives the temporal muscle
<i>Fossa condylöidea</i>	Receives the condyloid process of the lower maxilla.

The proper Foramina consist of five pairs placed externally, five pairs internally.

The common Foramina consist of three pairs.

*The proper external Foramina are,*

<i>Foramina auditiva externa</i>	The openings from the external ears into the cavity of the tympanum
<i>Foramina stylo mastöidea</i>	Transmit the portio dura of the seventh pair of nerves, and small branch of occipital artery.
<i>Fissuræ glasseri</i>	Transmit the chordæ tympani
<i>Foramina carotica externa inferiora</i>	Transmit the carotid arteries and branches of communication between the great sympathetic nerves and the fifth and sixth pairs of cerebral nerves.
<i>Foramina eustachii</i>	Transmit the eustachian tubes

*The proper internal Foramina are*

<i>Foramina auditoria interna</i>	Transmit the portio mollis and portio dura of the seventh pair of nerves and small artery
<i>Foramina innominata, or Hiatus Fallopii</i>	Transmit the nervi innominati or reflected branch from second division of the fifth.
<i>Aquæductus cochlearum</i>	Terminations of canals communicating with the internal ear.
<i>Aquæductus vestibulorum</i>	
<i>Foramina carotica anteriora superiora</i>	Terminations of the carotid canals

*The common Foramina are*

<i>Foramina lacera basis cranii anteriora</i>	Transmit the vidian nerves and small arteries to the dura mater.
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*Foramina lacera* Transmit the internal jugular veins,  
*basis cranii pos-* pneumo gastric, glosso-pharyngeal  
*teriora* and accessory nerves.

*Foramina mastöi-* Small veins to lateral sinuses.  
*dea*

*Connexions.*—The Temporal Bones are connected, above to the parietal bones, *anteriorly* to the sphenoid and malar, *posteriorly* to the occipital bones and to the inferior maxilla.

*Muscles arising from the Ossa Temporum.*

Occipito-frontalis	Levatores palati
Masseteres	Tensores tympani
Temporales	Levatores tympani
Digastrici	Stapedei
Stylo-hyöidei	Retrahentes aures
Stylo-pharyngei	Anteriores aurium
Stylo-glossi	

*Muscles inserted into the Ossa Temporum :*

Sterno cleido-mastöidei	Trachelo-mastöidei
Splenii capitis	

## OS SPHENÖIDEUM.

The Sphenoid Bone is composed of the body (*corpus*), and processes (*apophyses*).

The body presents six surfaces, and is occupied by the sphenoidal sinuses.

*The superior sur-* Forms the Turkish saddle (*sella*  
*face* *Turcica*), bounded by the anterior and posterior clinoid processes and the olivary process (*processus clinöidei anteriores et posteriores, processus olivaris*).

*The inferior sur-* Offers the azygos process and tri-  
*face* angular bones on the sides (*rostrum sphenöidale vel processus azygos et ossa triangularia*).

**The anterior sur-** Joins the ethmoid bone.  
face

**The posterior sur-** Joins the sphenoid bone  
face

**The lateral borders** Presents sulci for the internal carotid arteries

The apophyses are divided into the larger and smaller wings (*alæ majores et minores*), and pterygoid processes (*processus pterygoidei*).

**The alæ majores** Processus temporales, orbitales, maxillares, spinosi et hamati.  
are formed by ten processes.

**The alæ minores** are Processus clinöidei anteriores and composed of processus spinosi.

**The pterygoid processes** are proper The Laminæ pterygoideæ internæ and externæ and the unci pterygoidei.  
to the external surface, and are composed of

*Six pairs of Foramina are proper to the Bone.*

**Foramina optica** Give passage to the optic nerves and ophthalmic arteries.

**Fissuræ sphenoidales** Give passage to the third, fourth, first division of the fifth, and sixth pair of nerves and ophthalmic veins.

**Foramina rotunda** Give passage to the second division of the fifth pair of nerves.

**Foramina ovalia** Give passage to the third division of the fifth pair of nerves.

**Foramina spinosa** Give passage to the middle meningeal arteries.

**Foramina pterygoidea** Give passage to the vidian nerves.

*Four pairs are common to it and other Bones.*

*Between sphenoid and temporal Bones.*

**Foramina lacera basis cranii anteriora** For the passage of the vidian nerves.

*Between the sphenoid, maxillary, and palate Bones.*

*Foramina pterygo-palatina* Transmit the palato-maxillary nerves and branches of internal maxillary arteries.

*Between the sphenoid and super maxillary Bones.*

*Foramina lacera orbitalia inferiora* Transmit the infra orbital nerves and infra orbital vessels.

*Between the sphenoid and palate Bones.*

*Foramina spheno-palatina* Transmit the lateral nasal branches of the second division of the fifth.

*Connexion.*—The sphenoid is connected to thirteen bones, with the palate bones, frontal, parietal, malar, superior maxillary, temporal and occipital bones, also with the vomer.

*Muscles arising from the Os Sphenöideum.*

Levatores palpebrarum	Pterygöidei interni
Depressores oculorum	Pterygöidei externi
Adductores	Buccinatores
Abductores	Constrictor pharyngis superior
Obliqui superiores	
Levatores	Tensores palati
Temporales	Externi mallei
	Tensores tympani

## OS ETHMÖIDEUM.

The ethmoid bone presents, *superiorly*, the cribriform plate (*lamina cribrosa*), with the cocks crest (*crista galli*), *inferiorly*, the nasal lamella (*lamella nasalis*), *laterally*, the ethmoidal cells (*cellulæ ethmöïdales anteriores and posteriores*), the superior spongy bone and the orbital bones (*ossa turbinata superiora et ossa plana*) *anteriorly*, it joins with the frontal, *posteriorly*, with the

sphenoid. The foramina are, foramina cribrosa for the transmission of the olfactory nerves, and a nasal branch from the fifth pair of nerves.

*Connexions.*—The ethmoid is connected with the frontal, sphenoid superior maxillary and lacrymal bones, with the vomer, the palate, and nasal bones.

No muscles attached.

The bones of the cranium are connected together by peculiar joinings, termed sutures.

The principal sutures may be thus enumerated:

Sutura coronalis	Sutura squamosa
Sutura sagittalis	Sutura ethmöidalis
Sutura lambdöidea	Sutura sphenöidalis

By some Anatomists are described the

Additamentum suturæ squamosæ.

Additamentum suturæ lambdöidalis.

*The coronal suture* connects the frontal with the parietal bones: it commences about an inch behind the orbit, and passes upwards and backwards to the summit of the head, then descends and terminates at the same point on the opposite side.

*The sagittal* connects the two parietal bones together, extending from the centre of the coronal suture before, to the lambdoidal behind.

*The lambdoidal* connects the occipital bone with the parietal bones; it passes downwards, on either side, from the termination of the sagittal suture; its course is frequently rendered irregular by numerous detached portions of bone (*ossa triangularia*, or *ossa Wormiana*). This suture may be traced forwards at the base of the skull, constituting the addamentum suturæ lambdöidalis.

*The squamous sutures* commence at the root of the mastoid process, arch forwards, over-laping the parietal bones; they then descend beneath the zygoma, and terminate at the base of the cranium. They connect the temporal with the parietal bones. A continuation of this suture joins the sphenoid with the temporal (*additamentum suturæ squamosæ*).

*The ethmoidal and sphenoidal sutures* surround the bones of these names, and in some places form part of other sutures.

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## THE BONES OF THE FACE,

The bones of the face have been divided into those of the upper and lower maxillæ or jaws. The bones of the face are considerably larger in the adult in proportion to those of the cranium, than in the infant, which are short, owing to the want of teeth and maxillary sinuses.

*The Bones of the Face are fourteen in number:*

- |                              |                      |
|------------------------------|----------------------|
| II. Ossa nasi                | II. Ossa palatina    |
| II. Ossa lacrymalia          | II. Ossa malarum     |
| II. Ossa maxillaria superi-  | I. Vomer             |
| ora                          | I. Inferior maxilla. |
| II. Ossa turbinata inferiora |                      |

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## OSSA NASI.

The nasal bones present an external surface, an internal surface, and four borders (*superficies externa et interna, quartuor margines*). The external surface is smooth and convex from side to side, and assists in forming the dorsum of the nose, the internal surface concave, and marked by a groove for the passage of a branch of the nasal nerve.

*The superior border* Is serrated, and joins the os frontis.

*The inferior border* Is expanded, and gives attachment to the cartilages of the nose.

*The internal border* Unites the bone to its fellow.

*The external border* Is grooved, and receives the nasal process of superior maxillary bone.

Internally at their union the bones form a sharp spine.

*Muscles attached to the Ossa Nasi.*

Compressores narium      Pyramidales nasi

## OSSA LACRYMALIA.

The lacrymal bones present an orbital and nasal surface, four borders, (*superficies orbitalia, superficies nasalis, et quatuor margines.*)

*The orbital surface* Is divided into two portions, a posterior, plane, which assists in forming the orbit; and an anterior, hollowed, for receiving the lacrymal sac.

*The nasal surface* Is concave, and assists in forming the ethmoidal cells and middle meatus narium.

*Superior margin* Joins the os frontis.

*Inferior margin* Joins the orbital process of the superior maxillary bone.

*External margin* Joins the nasal process of the same bone

*Internal margin* Joins the ethmoid

*No Muscles attached.*

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## OSSA MAXILLARIA SUPERIORA.

Each maxillary bone is divided into the body and processes. The body forms the central portion of the bone, and is hollowed out, constituting the antrum Highmorianum. The processes are processus nasales, zygomatici, orbitales, alveolares, et palatini.

*Nasal process, on either side* Passes upwards from the inner border of the body, reaches as far as the os frontis, and forms the lateral parts of the nose. The internal surface presents a sharp ridge to support the inferior spongy bone.

*Zygomatic process* Joins the malar bone, and is placed on the external border.

- Orbital process.** Is placed superiorly of a triangular shape, and forms the floor of the orbit.
- Alveolar process** Constitutes the inferior margin of the body, and offers eight alveoli, in which the teeth are implanted. The posterior part, where there are no teeth, is called the maxillary tuberosity.
- Palatine process** Projects inwards, concave both above and below to enlarge the cavities of the nose and mouth; united with its fellow internally, forming above, at the point of junction, a sharp continued spine.

*The proper Foramina are.*

- Foramina infra orbitalia** Give passage to the infra orbital nerves and vessels.
- Foramina incisiva** Give passage to the naso palatine nerves and arteries.

*The common Foramina,*

- Fissuræ palato maxillares** Admit the infra orbital nerves and arteries to pass to the infra orbital canals.
- Ductus incisivi** Canals for naso palatine nerves and arteries.

**Connexions.**—The superior maxillary bones are connected to the malar, nasal, frontal, lacrymal, ethmoid, palate and inferior spongy bones, also to the vomer.

*Muscles attached.*

- |                         |                             |
|-------------------------|-----------------------------|
| Orbiculares palpebrarum | Levatores labii superioris  |
| Musculi nasales         | alæque nasi                 |
| Buccinatores            | Depressores                 |
| Compressor narium       | Obliqui oculorum inferiores |
| Levatores anguli oris   |                             |

## OSSA TURBINATA INFERIORA.

The inferior spongy bones present each an anterior process (*processus lacrymalis*), which passes upwards to the lacrymal plate of the os-lacrymale, a posterior process (*processus maxillaris*), attached to the lower opening of the maxillary antrum, and between the two the ethmoidal processes are placed (*processus ethmoidales*).

*Connexions.*—The spongy bones are connected to the nasal processes of the superior maxillary and palate bones.

No muscles attached.

## OSSA PALATINA.

The palate bones are of irregular shape, and may be divided into palatine, nasal, and orbital portions (*pars palatina, nasalis, et orbitalis*).

The palatine portion is quadrangular in shape, and presents two surfaces and four borders.

<i>Superior surface</i>	Is concave, to enlarge the cavity of the nares.
<i>Inferior surface</i>	Is also concave, to form the posterior part of the roof of the mouth.
<i>Anterior border</i>	Is serrated, and joins the superior maxillary bone.
<i>Posterior border</i>	Is lunated, and looks towards the back of the fauces, and presents externally the <i>processus pterygöidei</i>
<i>Internal border</i>	Is indented for union with each other, their junction forming superiorly the <i>spina nasalis</i> .
<i>External border</i>	Joins the nasal portion.

The nasal portion passes perpendicularly upwards, is concave internally, and presents a transverse ridge (*processus nasalis*); to the anterior upper edge is attached, by a narrow neck, a triangular process (*pars orbitalis*).

This bone possesses no proper foramina.



**Connexions.**—It is connected to its fellow, with the superior maxillary, ethmoid, sphenoid, vomer, and inferior spongy bones.

*Muscles attached.*

Azygos uvulæ  
Tensores palati  
Buccinatores  
Pterygoidei interni

Pterygoidei externi  
Constrictor pharyngis superior.

## OSSA MALARUM.

Each malar bone is of a quadrilateral shape, and may be divided into the facial, temporal, and orbital portions (*pars temporalis facialis et orbitalis*).

**The facial portion** Is convex, pierced by small foramina, and is placed anteriorly, the anterior angle joins the superior maxillary bone; the posterior forms the processus zygomaticus

**The temporal portion** Is concave and smooth above, and enters into the formation of the temporal fossa.

**The orbital portion** Is lunated, and forms the anterior, external, and lower part of the orbit.

*They present one pair of Foramina.*

**Foramina zygomatica** For the passage of small branches from the second division of the fifth pair of nerves.

**Connexions.**—They are connected to the frontal, sphenoid, superior maxillary and temporal bones.

*Muscles attached.*

Levatores labii superiores	Masseteres
Zygomatici majores	Orbiculares palpebrarum
Zygomatici minores	

## VOMER.

The Vomer is flat and irregularly quadrilateral: it presents two surfaces and four borders (*quatuor margines.*)

<i>Superior border</i>	Receives the azygos process of the sphenoid bone.
<i>Inferior border</i>	Joins the spines of the palatine processes of the superior maxillary and palate bones.
<i>Anterior border</i>	Is grooved and united to the nasal lamella of the ethmoid bone.
<i>Posterior border</i>	Is lunated and turned towards the pharynx. This bone seldom divides the nares into two equal portions.

*Connexions.*—It is connected with the sphenoid, with the superior maxillary ethmoid and palate bones.

## OS MAXILLARE INFERIUS.

The inferior maxillare may be divided into the horizontal and ascending plate (*ramus horizontalis et adscendens.*)

<i>The horizontal plate</i>	The anterior and central portion is termed the chin; the middle line joining the symmetrical sides, the symphysis, marked internally by a perpendicular spine. The superior third of the internal spine gives attachment to the frænum linguæ; the middle third, to the genio-glossi; the inferior third to the genio-hyo-glossi. On either side are two rough surfaces for the digastrici. The superior margin is of considerable breadth, and offers sixteen alveoli for the
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roots of the teeth; the lower border is rounded and obtuse, forming the base; at the extremities of the inferior margin, where the plate passes upwards, the *angles* are situated. The anterior surface is divided by an oblique line into an anterior and posterior portion, giving attachment to muscles. The internal surface is concave, and presents an oblique ridge for the attachment of the mylo-hyoidei muscles and internal membrane of the gums. About an inch on either side from the symphysis in the centre, the foramen maxillare anterius is placed.

*The ascending plate*

Passes upwards and backwards from the angle, and terminates in two processes; *anteriorly* in the processus coronöideus; *posteriorly* in the processus condylöideus. Between the two is placed a semilunar notch (*incisura semilunaris*). The condyle is supported by a contracted portion, termed the *neck*. On the inner surface, in the centre, may be observed a large irregular hole, the entrance into the maxillary canal: below the entrance, the bone is grooved for the passage of a small twig of the inferior maxillary nerves and vessels.

*The Foramina are,*

*Foramina maxillaria posteriora*

The entrances into the (*canales mentales*) mental canals transmitting the inferior maxillary nerves and vessels.

*Foramina maxillaria anteriora*

The terminations of the mental canals.

**Connections.**—It is connected with the *ossa temporum*.

*Muscles arising from the os maxillare inferius :*

Triangulares oris	Genio-glossi
Quadrati genæ	Genio-hyo-glossi
Levatores labii inferioris	Constrictor pharyngis superior
Buccinatores	
Mylo-hyoidei	

*Muscles inserted into the os maxillare inferius :*

Temporales	Pterygoidei interni
Masseteres	Pterygordei externi
Digastrici	Platysma myoides

The bones of the head are connected to those of the face by the *sutura transversalis et zygomatica*. Between the bones of the face fifteen sutures are found :

I Sutura nasalis anterior	X Sutura mystachialis
II III Suture nasales laterales	XI Sutura palatina longitudinalis
III IV Suture lacrymales	XII Sutura palatina transversalis
VI VII Suture orbitales internæ	XIII XIV Suture palato-maxillares
VIII IX Suture orbitales externæ	XV Sutura spinosa

*The anterior nasal* is placed longitudinal between the *ossa nasi*.

*The lateral nasal* intervene between the nasal process of the superior maxillary bones on either side and nasal bones.

*The internal orbital* pass from the apex of the orbit to the fore part of the cheek.

*The external orbital* are continued each from the end of the internal orbiter to the under and fore part of the cheek.

*The mystachial* passes from the septum narium to between the two middle dentes incisores.

*The longitudinal palate* runs through the middle of the palate.

*The transverse palate* crosses between the palate bones and palatine process of the superior maxillary bones.

*The palato maxillary* are at the back part of each side of the nostril.

*The spinous* is in the lower part of the middle of the nares.

The *transverse suture* stretches across the face from the external angular process of one orbit to that of the other. In its course it traverses the orbit and root of the nose. It connects the bones of the face with those of the head.

The *zygomatic suture* connects the malar with the temporal bones.

## BASE OF THE SKULL.

The following principle parts appear internally :

*The anterior region, which is the highest, contains,* Crista galli and cribriform plate of the ethmoid bone, spine and orbital processes of the frontal bone.

*Middle region, lower* Sella turcica with the anterior and posterior clinoid processes, processus olivaris, the transverse spines, the orbital, temporal, and spinous processes, the superior ridges of the petrous portion of of the temporal bone.

*Posterior region, lowest* Basilar process of the os occipitis, fossæ, and spinæ cruciatæ.

### *Foramina at the internal basis.*

*Foramen cæcum* For the transmission of small vein to superior longitudinal sinus, and it also receives a process of the dura mater.

*Foramina cribrosa* First pair of nerves and a nasal twig from the nasal branch of the first division of the fifth pair of nerves.

*Foramina optica* Optic nerves, and ophthalmic arteries.

<i>Fissuræ sphenoidales</i>	Third pair of nerves, fourth pair, first division of the fifth, sixth pair of nerves, and the ophthalmic veins.
<i>Foramina rotunda</i>	Second division of the fifth pair of nerves
<i>Foramina ovalia</i>	Third division of the fifth pair of nerves.
<i>Foramina spinosa</i>	Arteriæ meningæ mediæ.
<i>Exitus canalium caroticorum</i>	The carotid arteries, and branches of connection between the cerebral nerves and great sympathetic nerves.
<i>Foramina lacera basis cranii anteriora</i>	The vidian nerves, and also small arteries to the dura mater.
<i>Foramina innominata, or hiatus Follopii</i>	Branches of the vidian nerves.
<i>Exitus aquæductûm vestibulorum.</i>	To allow the fluid contained within the cavities of the cochleæ and vestibules to recede.
<i>Exitus aquæductûm cochlearum</i>	
<i>Meatus auditorii interni</i>	For the portio mollis and portio dura of the seventh pair of nerves, and small arteries
<i>Foramina condylidea anteriora</i>	Ninth pair of nerves.
<i>Foramina lacera basis crani posteriora</i>	Internal jugular veins, glosso-pharyngeal, accessory and eighth pair of nerves, and small arteries to the dura mater
<i>Foramen magnum</i>	Medulla spinalis with its membranes and vessels, vertebral arteries, accessory nerves, and sinus venosus.

*Base of the skull externally.*

Nasal lamella, ossa turbinata, ethmœïdales cellulæ, ossa plana.

Processus azygos, ossa triangularia, processus pterygoidei, orbitales, temporales, and processus spinosi.

**Basilaris** processus, partes petrosæ, processus stylöidei, vaginales, zygomatici, fossæ glenöideæ.

**Foramen magnum**, processus condylöidei, mastöidei, fossæ digastricæ, processus jugulares.

*Foramina of the external surface are as follow :*

**Foramina parietalia** Small arteries and veins.

**Foramina supra orbitalia** Supra orbital nerves and arteries.

**Foramina orbitalia anteriora interna** Nasal twig of the first branch of the fifth pair, and anterior branches of ethmoidal arteries.

**Foramina orbitalia interna posteriora** Posterior branches of ethmoidal arteries.

**Foramina infra orbitalia** Infra orbital nerves and vessels.

**Foramina Pteryöidea** Pterygoid nerves and small arteries.

**Meatus auditorii externi** External opening of the apparatuses of hearing.

**Fissuræ glasseri** Chordæ tympani, musculi tympani laxatores

**Foramina eustachii** Terminations of the eustachian tubes.

**Foramina carotica** Entrances into the carotid canals

**Foramina stylo mastoidea** Portio dura of the seventh pair of nerves, stylo-mastoid arteries and veins.

**Foraminamastoidea** Veins to the lateral sinuses.

## OF THE ORBITS.

Each orbit is composed of seven bones, *the roof* is formed by the frontal bone, *the floor* by the orbital process of the superior maxillary bone, *outer wall* by the malar bones and sphenoid bones, *the inner wall* by the lacrymal bone and ethmöid bone, and the palate bone completes the posterior part.

## THE NOSTRILS.

Fourteen bones enter into the formation of the nares. The *arch* of the nose is formed by the nasal, superior maxillary, and lacrymal bones, the *root* by the ethmoid, the *floor* by the palatine process of the superior maxillary, and palate bones. The *septum narium* is formed by the nasal lamella of the ethmoid, zygomatic process of the sphenoid, the vomer, nasal spine, and palatine process of the superior maxillary and palate bones. The cavity is divided into three chambers:

### *Superior chamber.*

Occupies the ethmoid bone,	<i>Openings.</i>
	From posterior ethmoidal and sphenoidal sinuses.

### *Middle chamber.*

Between superior and inferior spongy bones.	Frontal and anterior ethmoidal sinuses.
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### *Inferior chamber.*

Between inferior spongy bones and palatine processes of the palate and superior maxillary bones.	Nasal ducts.
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## DENTES.

The teeth are thirty-two in number and have been divided into the incisors, canine, and molar (*dentes incisores, cuspidati vel canini, et molares*). The incisors are eight in number, the canine four in number, the molar twenty in number. Each tooth consists of a body (*corona*), and of one or more roots (*radices*); and between these there is a contracted portion, which has been called the neck (*collum*). The roots of the teeth are implanted within the alveolar processes of the jaws in the same manner as a nail is inserted into a piece of wood; this mode of connexion is termed *gomphosis*.





equal length joined by a common basis, and of these, the upper or longer is composed of twenty-four bones (*vertebræ veræ*), the lower or shorter is composed of bones which are immoveable (*vertebræ spuræ*). The vertebral column does not describe a right line, but, when examined in profile it appears undulated in its course, *in the neck (regio cervicalis)* it advances forwards; *in the back (regio thoracica)* it inclines backwards; *in the loins (regio abdominalis)* it again projects forwards; lastly, at its lower extremity (*regio sacralis*) it is turned forwards. The true vertebræ are subdivided into three classes, the cervical containing seven vertebræ, the dorsal twelve, the lumbar five.

Each vertebra is divided into its body (*corpus*) and and processes (*apophyses*). The *body* forms the anterior and most considerable part, *the processes* are seven in number, *two superior* obliquely ascending, *two inferior* obliquely descending, (*processus obliqui*) *two transverse*, (*processus transversi*) and *one spinous* (*processus spinosus*). The foramina and cavities are the great foramen which concurs to form the spinal canal continued through the whole spine, in which the medulla spinalis with its membranes and vessels are lodged. *Four notches* on either side (*quatuor incisuræ*) *one superior*, *one inferior*, the latter uniting with the superior, thus forming the lateral *foramina* of the vertebræ, (*foramina intervertebralia*) for the transmission of the spinal nerves.

### *Characters of the Cervical vertebræ considered generally.*

The vertebræ of the neck are seven in number, their *bodies* are small and compact, of firm texture, flattened before and behind; the *superior surfaces* are hollowed transversely from side to side, their *inferior surfaces* from behind forwards. The *two superior articulating processes* are placed obliquely upwards and backwards, the *two inferior* downwards and forwards; *the transverse processes* short, and bifurcated, pass outwards and are perforated by foramina for the vertebral arteries. The *spinous processes* short, and bifid, pass backwards. The vertebral *foramen* is of triangular form,

The *first*, *second* and *seventh* cervical vertebræ offer peculiarities. The *first*, called the atlas, is merely a bony ring without either body or spine, it is convex anteriorly and presents a small eminence; concave in the opposite direction, where a slight oval depression may be observed, covered by cartilage receiving the *processus dentatus*. The *superior oblique* processes are concave and turned towards each other, and present, on their inner borders, two small tubercles for the attachment of the transverse ligament; behind, and winding backwards, are two grooves for the vertebral arteries: the *inferior articulating* processes are nearly horizontal; the *transverse processes* are long and terminate in a more obtuse point.

The *second* vertebra of the neck is called (*axis, epistropheus, et vertebra dentata*). The body is of a triangular shape, it exceeds in thickness and strength the other cervical vertebræ; from its upper surface arises the *odontoid process*, (*processus dentatus*) which rests in contact before with the articulating surface on the anterior arch of the atlas, and is grooved behind for the transverse ligament. The *superior articulating processes* are nearly horizontal. The *transverse processes* are very short, oblique, and not bifurcated and divided above by an acute eminence into two lateral portions, and below, by a line, into two cavities.

Of the *seventh cervical*. The body is broader; its *inferior* surface is almost flat; its *spinous process* is elongated, and terminates in a tubercle. Sometimes there are foramina in the transverse processes, which are small, and transmit only veins; sometimes they are wanting.

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## THE VERTEBRÆ OF THE BACK.

Next to the cervical, are placed the twelve dorsal vertebræ: the four superior are the largest, and the others below gradually become smaller. Their bodies are of firm and compact structure externally, of spongy texture internally, convex before, and concave behind.

Their *superior* and *inferior surfaces* are flattened. On each side of the bodies, on the superior and inferior margins, near the transverse processes, there is a semi-lunar concavity, lined with cartilage; the inferior half concavities, together with the superior, form articulating depressions, into which the posterior extremities of the ribs are received; hence each rib articulates between the bodies of two vertebræ. The *oblique processes* are placed nearly perpendicular; the two *superior* are directed backwards; the two *inferior* forwards. The *transverse processes* are long, and turned obliquely backwards; on the extremities there are articular cavities lined with cartilage for the reception of the tubercles of the ribs. The *spinous processes* are long, and slope downwards and backwards; they terminate in a tubercle. From their posterior surface arises a ridge, which is received into a groove in the fore part of the spinous process immediately above. The *spinal foramen* is circular, and smaller than in any of the other vertebræ.

In the dorsal region, the following vertebræ present peculiarities:—

*First dorsal*,—The body is larger, and presents on each side one whole and half of another articulating depression for the heads of the ribs. The *articular processes* are oblique. The *spinous process* is nearly horizontal in its direction.

*The tenth dorsal*,—The body offers one half of an articulating cavity.

*The eleventh and twelfth dorsal*, present one whole articular cavity on either side of the body: no articular surface on the transverse processes.

## CHARACTERS OF THE LUMBAR VERTEBRÆ.

The five lumbar vertebræ, which are placed immediately after the dorsal, are the last and largest of the true vertebræ. The bodies are of firm texture externally; of a spongy structure internally; of an oval shape, the longest diameter transversely; flattened above and below; concave from above downwards, on their fore part.

*The superior oblique processes* are strong, concave, and face inwards; *the inferior* are convex and face outwards. *The transverse processes* are long and slender, and pass directly outwards. *The spinous processes* are broad and expanded, and pass directly backwards, and are divided by a prominent line into two labia. *The foramen* for the spinal cord is rather larger than in the vertebræ of the back, triangular in the superior, oval in the inferior lumbar vertebræ.

The bones just described as a whole, present an *anterior* surface, two *lateral* surfaces, a *base* and a *summit*. *The anterior surface* is broad in the cervical, contracted in the dorsal, expanded in the lumbar regions, and is covered from above downwards, with the anterior vertebral ligament (*ligamentum commune anterius*). *The posterior surface* present in the medium line the spinous processes and on either side the *vertebral grooves*. *The lateral surfaces* are distinguished by the transverse processes the intervertebral foramina, and articulating depressions for the heads of the ribs. *The base* joins the sacrum. *The summit* articulates with the os occipitis.

### *Use of the Spinal Column.*

It supports the head and chest, it lodges and protects the spinal marrow with its membranes, it gives passage to the spinal nerves and it is the source of all the motions of the trunk.

### *Muscles arising from the vertebræ cervicis :*

Trapezii	Recti capitis postici minores
Splenii	Obliqui superiores
Complexi	Obliqui inferiores
Recti capitis postici majores	Recti capitis laterales
Recti capitis antici majores	Serrati postici superiores
Recti capitis antici minores	Trachelo-mastöidei
Sacro lumbales	Cervicales descendentes
Longissimi dorsi	Transversales colli
Rhomböidei	Scalenii antici medii et postici
Levator anguli scapulæ	Semispinales colli
Inter-spinales colli	Inter-transversales colli
Longi colli	

*Muscles arising from the dorsal vertebræ.*

Trapezii	Diaphragma
Sprenii	Psoæ parvi
Rhomboidei	—— magni
Latissimi dorsi	Multifidæ spinæ
Sacro-lumbales	Semispinales dorsi
Longissimi dorsi	Inter-transversales
Serrati postici inferiores	Inter-spinales
Musculi accessorii	

*Muscles arising from the lumbar vertebræ.*

Transversales abdominis	Musculi accessorii
Obliqui abdominis interni	Quadrate lumborum
Sacro lumbales	Psoæ magni
Longissimi dorsi	—— parvi
Latissimi dorsi	Diaphragma
Serrati postici inferiores	Spinales et intertransversales

## OF THE BONES OF THE CHEST.

*The thorax*, or chest, is a large cavity of a conoid shape, narrow above, broad below, flat anteriorly, hollowed posteriorly, convex laterally, placed in front of the dorsal region of the vertebral column and destined to contain the proper organs of respiration and circulation. It is composed of thirty-seven bones, the twelve dorsal vertebræ posteriorly, the sternum anteriorly and the twenty-four ribs laterally.

## OSSA STERNI.

The sternum is placed longitudinally between the cartilages of the true ribs, in a direction downwards and forwards, it is divided into three parts, a superior, termed the *manubrium*; a middle, the body (*corpus*); and an inferior, the ensiform process (*processus xiphoides*).

*The upper portion* is of a cordiform shape, expanded

*The anterior extremity* is broader and more flat, hollowed by an oval surface receiving the costal cartilages (*cartilagine costales*).

The first, the eleventh, and twelfth ribs present peculiar characters:—*the first rib* is broader, shorter, and nearly horizontal in its direction, it has only one articulating surface on its head, no groove for intercostal vessels, the superior surface is marked by depressions for the subclavian artery and vein. *The eleventh* has no groove on its inferior border, one articulating surface on the head, no tubercle. *The twelfth* has the same character, and is only shorter.

The costal cartilages complete the form of the chest. The seven superior are connected with the sternum and anterior extremities of the ribs; the cartilages of the eighth, ninth, and tenth join the seventh; the eleventh and twelfth are loosely connected with the abdominal muscles. These cartilages present neither cavities or canals.

*Motions of the ribs*,—The motions are upwards and outwards, downwards and inwards.

*Use*.—The ribs form the lateral parts of the chest, and enlarge that cavity; they defend the organs of respiration and circulation, and also afford an extensive surface for the attachment of muscles.

*Connexions*—By ginglymus their heads are attached to the vertebræ, and their tubercles by arthrodia to the transverse processes.

#### *Muscles arising from the Ribs.*

Sterno hyöidei	Obliqui abdominis externi
Sterno thyroïdei	Serrati magni
Subclavii	Cervicales descendentes
Pectorales majores	Latissimi dorsi
Pectorales minores	Intercostales externi
Diaphragma	Intercostales interni

#### *Muscles inserted into the Ribs.*

Scaleni antici	Obliqui abdominis interni
Scaleni medii	Transversales
Scaleni postici	Recti abdominis
Intercostales externi	Serrati postici superiores
Intercostales interni	Serrati postici inferiores
Quadrati lumborum	Longissimi dorsi

## OF THE UPPER EXTREMITY.

The upper extremity is composed of the shoulder, the upper arm, fore arm, and hand.

### OF THE BONES OF THE SHOULDER.

The shoulder is composed of two bones, the scapula and the clavicle. The Clavicle (*clavicula*) is situated at the superior and anterior part of the chest between the Scapula and sternum, in figure it resembles the italic *S*.

We may divide it into body, sternal, and scapular extremities (*pars sternalis, corpus, et pars scapularis*).

The *sternal extremity* is of triangular shape, hollowed from behind to before, and receives an interarticular cartilage. The apex is situated inferiorly and posteriorly and gives attachment to the interclavicular ligament.

The *body* presents two surfaces, a superior and an inferior, the former is smooth, slightly flattened; the latter rough and irregular for the attachment of muscles and ligaments, about the middle inferiorly and somewhat posteriorly a small foramen is observed for the transmission of the nutritious artery of the bone. The anterior margin is concave, the posterior convex.

The *scapular extremity* is flat and broad and joins the acromion by a plain surface covered with cartilage, superiorly it is marked for the attachment of muscles, inferiorly it offers a prominent ridge for the insertion of the coraco-clavicular ligaments.

*Use.*—To unite the scapula and arm to the chest, to prevent the extremities rolling inwards across the thorax, and to defend the subclavian vessels and axillary plexus of nerves.

*Connexions.*—It is connected to the sternum and scapula by arthrodia.

#### *Muscles arising from the clavicle.*

*From sternal half* Sterno clëido mastöideus  
Sterno-hyöideus  
Sterno thyröideus  
Pectoralis major



*The anterior extremity* is broader and more flat, hollowed by an oval surface receiving the costal cartilages (*cartilagines costales*).

The first, the eleventh, and twelfth ribs present peculiar characters:—*the first rib* is broader, shorter, and nearly horizontal in its direction, it has only one articulating surface on its head, no groove for intercostal vessels, the superior surface is marked by depressions for the subclavian artery and vein. *The eleventh* has no groove on its inferior border, one articulating surface on the head, no tubercle. *The twelfth* has the same character, and is only shorter.

The costal cartilages complete the form of the chest. The seven superior are connected with the sternum and anterior extremities of the ribs; the cartilages of the eighth, ninth, and tenth join the seventh; the eleventh and twelfth are loosely connected with the abdominal muscles. These cartilages present neither cavities or canals.

*Motions of the ribs*,—The motions are upwards and outwards, downwards and inwards.

*Use*.—The ribs form the lateral parts of the chest, and enlarge that cavity; they defend the organs of respiration and circulation, and also afford an extensive surface for the attachment of muscles.

*Connexions*—By ginglimus their heads are attached to the vertebræ, and their tubercles by arthrodia to the transverse processes.

#### *Muscles arising from the Ribs.*

Sterno hyöidei	Obliqui abdominis externi
Sterno thyroïdei	Serrati magni
Subclavii	Cervicales descendentes
Pectorales majores	Latissimi dorsi
Pectorales minores	Intercostales externi
Diaphragma	Intercostales interni

#### *Muscles inserted into the Ribs.*

Scaleni antiqui	Obliqui abdominis interni
Scaleni medii	Transversales
Scaleni postici	Recti abdominis
Intercostales externi	Serrati postici superiores
Intercostales interni	Serrati postici inferiores
Quadrati lumborum	Longissimi dorsi

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*The sternal extremity* is of triangular shape, hollowed from behind to before, and receives an interarticular cartilage. The apex is situated inferiorly and posteriorly and gives attachment to the interclavicular ligament.

*The body* presents two surfaces, a superior and an inferior, the former is smooth, slightly flattened; the latter rough and irregular for the attachment of muscles and ligaments, about the middle inferiorly and somewhat posteriorly a small foramen is observed for the transmission of the nutritious artery of the bone. The anterior margin is concave, the posterior convex.

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*Use.*—To unite the scapula and arm to the chest, to prevent the extremities rolling inwards across the thorax, and to defend the subclavian vessels and axillary plexus of nerves.

*Connexions.*—It is connected to the sternum and scapula by arthrodia.

#### *Muscles arising from the clavicle.*

<i>From sternal half</i>	Sterno cléïdo mastöïdeus
	Sterno-hyöïdeus
	Sterno thyroïdeus
	Pectoralis major

*From scapular portion Deltoides.*

*Muscles inserted into the Clavicle.*

Subclavius

Trapezius

## OF THE SCAPULA.

The scapula is a large bone of triangular shape situated at the superior and posterior part of the chest, extending from the second to the seventh rib.

1, It presents an anterior and posterior surface; 2, Three margins; 3, Three angles; 4, Three processes; 5, Three fossæ; 6, The glenoid cavity and neck.

*The posterior surface (superficies dorsalis)*, is divided transversely into two unequal portions by the spine; the anterior surface (*superficies costalis*), is concave, and marked by prominent ridges, for the attachment of the subscapularis muscle.

*The margins* are: the superior (*costa superior*) which is the shortest, the posterior or base (*costa posterior*) the longest and nearest to the vertebrae, and lastly the anterior or inferior (*costa anterior*), descends from the neck of the bone obliquely backwards.

*The angles* are divided into a superior, which is situated between the superior and posterior margin; an inferior between the anterior and posterior margin, and an anterior angle occupying the superior and anterior margin. The processes are the spine, the acromion, and coracoid.

*The spine (spina scapularis)*, commences from the base above its middle, and passes upwards and outwards and terminates in an expanded process, termed the acromion. It divides the posterior surface of the scapula into two portions.

*The acromion process (acromion)*, overhangs the glenoid cavity, is flattened, and joins the clavicle by a plain surface, covered with cartilage.

*The coracoid process (processus coracöideus)*, is situated at the superior part of the anterior margin, on the inner side of the glenoid cavity, and in its direction

passes horizontally forwards. At the root of this process a deep notch is observed (*incisura semi/unaris*), converted into a foramen by the transverse ligament, for the transmission of the supra scapular nerve; but, above the ligament the scapular vessels usually pass.

*The three fossæ* are fossa supra and infra spinata, fossa subscapularis. The supra and infra spinal fossæ occupy the posterior surface above and below the spine; the subscapular occupies the internal surface and lies over the ribs and presents a foramen for the nutritious vessels.

*The anterior costa* is surmounted by an oval superficial articulating cavity, larger below than above (*cavitas glenöidea*); it offers at its upper part a small tubercle for the attachment of the long head of the biceps. It is supported by a contracted portion named the neck (*cervix scapulæ*).

*Use.*—Its use is to defend the posterior part of the chest as a shield; it also serves with the clavicle, as a fulcrum for the upper extremity.

*Connexions.*—It is connected by arthrodia with the clavicle; by enarthrosis with the humerus; by sysarcosis with the head, os hyöides, sternum, ribs and vertebræ.

#### *Muscles arising from the scapula.*

<i>From superior costa</i>	Omo-hyöideus
<i>From spine and acromion</i>	Deltöides
<i>From fossæ spinatæ</i>	Supra spinatus
	Infra spinatus
<i>From the base, inferior angle and anterior costa</i>	Teres major
	Teres minor
	Latissimus dorsi
	Triceps
<i>From coracoid process</i>	Biceps
	Coraco-brachialis
<i>From subscapular fossa</i>	Subscapularis

#### *Muscles inserted into the scapula.*

<i>Into the base</i>	Rhomböideus major
	Rhomböideus minor
	Serratus magnus

*Into the superior angle*

Levator anguli scapulae

*Into the coracoid process*

Pectoralis minor

## OF THE HUMERUS.

The Humerus is irregularly cylindrical, it may be divided into its superior and inferior extremities and body.

*The superior extremity* offers the following parts: the head, the neck, two tubercles, and the bicipital groove. The head (*caput humeri*) is hemispherical, smooth, and covered with cartilage; inclined inwards and backwards, and is articulated with the glenoid cavity of the scapula. The greater tubercle (*tuberculum majus*) is placed externally, and offers three surfaces, for the attachment of muscles: the smaller tubercle (*tuberculum minus*), is placed internally, having only one surface. The bone is contracted between the head and tubercles forming the neck (*cervix humeri*). Between these tubercles there is a deep groove directed downwards and inwards (*the fossa bicipitalis*); in which is lodged the tendon of the long head of the biceps; the borders of this fossa are rough and irregular for the attachment of muscles.

*The inferior extremity* is of triangular shape and flattened, bounded on either side by two processes termed the condyles (*condyli*); the external is somewhat rounded directed forwards; the internal the largest, inclines backwards and is grooved posteriorly for the passage of the ulnar nerve. Between the condyles are two articular eminences, one of which is double like a pulley, (*trochlea ossis humeri*), forming a hinge joint with the ulna; and the other rounded like a small head (*eminentia capitata*), and received into the articular cavity on the upper extremity of the radius. Above the articulating surfaces, anteriorly, is a depression, which lodges the coronoid process of the ulna when the fore-arm is bent; posteriorly, a deeper depression, receiving the olecranon when the fore-arm is completely extended. *The body* of the bone may be divided into

thirds; the upper third, rounded; the middle third, twisted; and the inferior one, flattened.

*The body* is marked by three prominent lines; the first *external*, passes from the greater tubercle to the outer condyle; the second *internal*, passes from the smaller tubercle to the inner condyle; and the third, *anterior*, passes from the bicipital groove as far as the external condyle. At the back part of the middle third, the *foramen* for the nutritious artery is placed, passing from above downwards.

*Use*.—To concur to form the arm.

*Connexions*.—It is connected above, by enarthrosis, with the scapula; inferiorly, with the radius and ulna by ginglymus.

#### *Muscles arising from the Humerus.*

<i>From the anterior surface</i>	Brachialis internus
<i>From the posterior surface</i>	Triceps extensor cubiti
<i>From ridge above the outer condyle, and outer border</i>	Supinator radii longus
	Extensor carpi radialis longior
	Extensor carpi radialis brevior
	Supinator radii brevis
	Anconeus
	Extensor carpi ulnaris
	Extensor digitorum communis
<i>From the inner condyle and inner border</i>	Pronator radii teres
	Flexor carpi radialis
	Palmaris longus
	Flexor carpi ulnaris
	Flexor digitorum sublimis

#### *Muscles inserted into the Humerus.*

<i>Into middle third externally</i>	Deltoides
<i>internally</i>	Coraco-brachialis
<i>Into greater tubercle</i>	Supra-spinatus
	Infra-spinatus
	Teres minor
<i>Into lesser tubercle</i>	Subscapularis
<i>Into outer edge of bicipital groove</i>	Pectorales major

*Into inner edge of bicipital groove* Teres major  
 Latissimus dorsi.

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## OF THE FORE-ARM.

The Fore-arm is composed of two bones, the radius and the ulna.

*The radius* is placed on the external side of the forearm, is continued on a line with the humerus; it is shorter than the ulna, and extends between the humerus and carpus. It may be divided into its superior, body, and inferior extremity.

*The superior extremity (caput radii)* is circular; the upper surface excavated and invested by cartilage, receives the small head of the humerus; the inner half of the circumference is also covered by cartilage, and articulates with the lesser sigmoid cavity of the ulna. About three quarters of an inch below the head, internally and posteriorly, a strongly marked process is placed (*tuber radii*) for the insertion of the biceps, between the head and tubercle the bone is contracted, forming the neck (*cervix radii*). *The inferior extremity* is broad and expanded, and of quadrilateral form; *anteriorly* it advances forward to support the annular ligament; *posteriorly* it is grooved by the extensor tendons; *externally* it is lengthened by a pyramidal process, the styloid process (*processus stylöideus*); *internally* it presents a semilunar cavity (*incisura semilunaris*), receiving the lower end of the ulna; lastly, *inferiorly* it offers two depressed articular surfaces covered by cartilage for connexion with the os scaphöides and os lunare.

*The body of the bone* is of triangular shape; the anterior and posterior surfaces are flattened; the external rounded, rough superiorly for the insertion of the supinator radii brevis; rough also in its centre, for the insertion of the pronator radii teres: internally it forms a sharp spine, for the attachment of the inter-osseous ligament.

*The foramen* for the nutritious artery of the bone passes from below upwards, and is placed about one-third down anteriorly.

*Use.*—It concurs in forming the fore-arm.

*Connexions.*—It is connected above with the small head of the humerus; below by arthrodia with the carpus; laterally, both above and below, with the ulna by lateral ginglymus.

*Muscles arising from the Radius.*

*From the anterior surface* Flexor sublimis digitorum

Flexor longus pollicis

*From the posterior surface* Extensor primi inter-nodii

*Muscles inserted into the Radius.*

*Into the tubercle* Biceps

*Into external border* Pronator radii teres

Supinator radii brevis

*Into styloid process* Supinator radii longus

*Into anterior surface inferiorly* Pronator quadratus

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## OF THE ULNA.

The Ulna is placed on the inside of the fore-arm, is longer than the radius, and of irregular triangular shape.

It may be divided into its body and extremities.

*The superior extremity* presents two processes, the larger of which, called the olecranon (*olecranon*), occupies the super and posterior part, behind it forms a triangular surface, smooth, and merely covered by the integuments; anteriorly it is concave, and invested with cartilage. The smaller process is more acute, is situated before and below the olecranon, and is termed the coronoid process (*processus coronöideus*). Between the two processes, the great sigmoid cavity is placed (*cavitas semilunaris major*); it is lined by cartilage, and divided into two unequal portions by a prominent line; this cavity moves upon the pulley of the os humeri. On the outside of the coronary process, and invested with cartilage, is a semi-lunated cavity, the lesser



sigmoid cavity receiving the head of the radius (*cavitas semilunaris minor*).

*The inferior extremity* is small and rounded; internally it is lengthened by a conical process, the styloid process (*processus styloideus*); externally, convex, covered with cartilage, and articulated with the sigmoid cavity of the radius; anteriorly, grooved for the ulnar vessels and nerve; posteriorly, a similar depression may be remarked for the tendon of the extensor carpi ulnaris; lastly, inferiorly, it is slightly concave, to receive the inter-articular cartilage,

*The body* is triangular, anteriorly concave, posteriorly rough and irregular, and divided by a raised line into two parts; internally, convex; externally, sharp for the attachment of the inter-osseous ligament. *The foramen* for the nutritious artery is placed anteriorly, about one third down, and passes in a direction from below upwards,

*Use.*—It concurs in forming the fore-arm.

*Connexions.*—It is connected above by angular ginglymus with the humerus; laterally, both above and below, by lateral ginglymus with the radius.

### *Muscles arising from the Ulna.*

<i>From the olecranon, coronoid process, and anterior surface</i>	Pronator radii teres
	Flexor digitorum sublimis
	Flexor carpi ulnaris
	Flexor digitorum profundus
	Pronator quadratus
<i>From posterior surface</i>	Flexor carpi radialis
	Supinator radii brevis
	Extensor carpi ulnaris
	Extensor ossis metacarpi pollicis
	Extensor primi et secundi internodii
	Indicator

### *Muscles inserted into the Ulna.*

<i>Into the olecranon</i>	Triceps
	Anconeus
<i>Into the coronoid process</i>	Brachialis anticus.

## OF THE BONES OF THE HAND.

The carpus is situated between the fore-arm and metacarpus; it consist of eight small bones arranged in two rows.

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### OF THE OS SCAPHÖIDEUM.

The scaphoid bone bears some resemblance to a boat, hence its name: it presents four surfaces—a *superior*, which is convex and joined to the inferior extremity of the radius; an *inferior*, convex, and joined to the trapezium and trapezoides; the *internal surface* has two depressions, by which it is articulated with the magnum and lunar; the *external surface*, unconnected, is rough for the insertion of ligaments.

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### OF THE OS LUNARE.

The lunar bone has received its name from its crescentic form, is smaller, and less elongated than the scaphoid. The *superior surface* is round and convex, and received into the inferior depression of the radius; the *inferior surface* is concave, and articulates with the magnum; the *outer surface* joins the scaphoid; and the *inner*, nearly triangular, rests against the cuneiform.

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### OF THE OS CUNEIFORME.

The cuneiform bone has received its name from its supposed resemblance to a wedge. Its *superior surface* is convex, and united to the inter-articular cartilage of the wrist joint; *inferiorly* it rests against the unciform bone; *externally* it articulates with the lunar; *internally* it gives attachment to ligament; lastly, on its *anterior surface*, the pisiform bone is lodged.

## OF THE PISIFORME.

The pisiforme bone is the fourth bone of the first series, is the smallest, and from its rounded figure it acquires its name. It is placed in front of the cuneiform bone.

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## OF THE OS TRAPEZIUM.

The trapezium is irregular in its form; it has four articular surfaces; *the superior*, which is concave and connected with the scaphoid; *the inferior*, which is convex from behind forwards, and concave transversely, receives the first bone of the metacarpus; *the internal*, which is turned upwards, articulates with the trapezoid and second bone of the metacarpus; *the external surface* is free from attachment.

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## OF THE OS TRAPEZÖIDEUM.

The trapezoid is smaller than the trapezium. Its *superior articular surface* is concave and connected with the scaphoid; *its inferior* joins the metacarpal bone of the index finger; *its external* is connected with the trapezium; *and internally* it articulates with the magnum.

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## OF THE OS MAGNUM.

The magnum is the largest of the carpal bones. It presents a small rounded head *superiorly*, which is covered with cartilage, and enters the cavity formed by the scaphoid and lunar; *inferiorly*, unequally triangular, it is connected with the metacarpal bone of the middle finger. Its *external surface* is united with the trapezoides; it is attached *internally* to the surface of the unciform.

## OF THE OS UNCIFORME.

The unciform is the fourth bone of the second row of the carpus. *Superiorly* it is narrow and rounded, and articulates with the lunar and cuneiform; *inferiorly* it is subdivided by a ridge into two surfaces, which receive the two last metacarpal bones; *externally* it joins the magnum; *internally* it is also articulated with the cuneiform.

The process from which it derives its name, extends from the internal part of the bone, somewhat curved upon itself outwards.

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*Use of these Bones.*—To facilitate the motions of the hand.

*Connexions.*—The carpus is connected with the bones of the fore-arm by arthrodia; by the same mode of connexion with each other, and with the metacarpus.

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## OF THE METACARPUS.

The Metacarpus is placed between the carpus and fingers, and is composed of five small cylindrical bones.

They present two surfaces, a body and two extremities. Their external surfaces are convex, and form the dorsum of the hand; their internal, which are concave, form the hollow or palm. Their bodies are narrow, and may be divided into three surfaces by three angles. Their posterior extremities join, by plain surfaces covered with cartilage, the carpal bone; their anterior extremities are convex from before to behind, and form heads; laterally flattened.

*The first bone* of the metacarpus is the shortest and thickest, and joins the trapezium; *the second* is the longest, and articulates with the trapezoides; *the third* may be distinguished by a rough surface and tuberosity, posteriorly, for the insertion of the extensor carpi radialis brevior; it is connected with the magnum; the body of the *fourth* is narrower and articulates with the unciform; the *fifth* is smaller; the inner border offers

a small tuberosity for the insertion of the extensor carpi ulnaris ; it is connected with the unciform.

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## OF THE FINGERS.

The fingers constitute the last and anterior part of the hand, and are composed of fourteen bones named phalanges.

Each finger is composed of three phalanges, but the thumb consists of only two. The phalanges are divided into the first or posterior, which are the largest and longest ; into the middle, and into the last or anterior, the smallest. The body and two extremities may be noticed of each of these as of all other cylindrical bones.

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## OF THE FIRST OR METACARPAL PHALANGES.

These five bones differ but little from each other excepting in size and length.

*Their superior extremity* presents an oval articular cavity for connection with the metacarpal bones ; *their inferior extremity* is formed like a pulley, and presents two depressions and two eminences or condyles, to receive the posterior extremity of the middle phalanx. *The body* is convex, posteriorly ; its internal surface concave.

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## OF THE SECOND OR MIDDLE PHALANGES.

In the thumb the middle phalanx is wanting. That of the middle finger is the largest, that of the little finger the shortest and most slender.

*Their superior extremity* presents a semilunar cavity, divided by a ridge for articulation, with the trochlea of the metacarpal phalanges.

*Their inferior extremity* offers two small condyles and two depressions. *The body* is concave before; posteriorly, convex.

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## OF THE INFERIOR PHALANGES.

The last phalanges resemble each other: that of the thumb is the broadest; that of the little finger the smallest. *Their superior extremity* presents a semi-lunar articular surface; *inferiorly* and *posteriorly* they are covered by the nails; *anteriorly*, concave.

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*Connexion.*—The first phalanges are connected with the metacarpal bones by arthrodia; with each other by angular ginglimus.

### *Muscles arising from the Bones of the Hand :*

<i>From os pisiforme</i>	Abductor minimi digiti
<i>From os trapezium</i>	Flexor ossi metacarpi pollicis
	Flexor brevis pollicis
	Abductor pollicis
<i>From the os magnum et trapezoidæum</i>	Flexor brevis pollicis
<i>From the os unciforme</i>	Flexor brevis minimi digiti
	Abductor minimi digiti

### *Muscles inserted into the Carpal Bones.*

<i>Into the os pisiforme</i>	Flexor carpi ulnaris
<i>Into the os trapezium</i>	Extensor primi internodii

### *Muscles arising from the Metacarpal Bones.*

<i>From metacarpal bone of the fingers.</i>	Interossei
<i>From metacarpal bone of middle finger</i>	Adductor pollicis

### *Muscles inserted into the Metacarpal Bones.*

<i>Into the Metacarpal bone of the fore finger</i>	Flexor carpi radialis
	Extensor carpi radialis longior

*Into metacarpal bone of middle finger*      Extensor carpi radialis bre-  
vior

*Into metacarpal bone of little finger*      Adductor minimi digiti  
Extensor carpi ulnaris

*Muscles inserted into the Phalanges of the Thumb.*

Flexor longus pollicis      Extensor ossi metacarpi

Flexor ossi metacarpi polli-      pollicis

cis      Extensor primi internodii

Flexor brevis pollicis      Extensor secundi internodii

Abductor pollicis      Adductor pollicis

*Muscles inserted into the Phalanges of the Fore-finger.*

Flexor sublimis      Lumbricalis

Flexor profundus      Indicator

Extensor communis      Abductor indicis

*Muscles inserted into the Phalanges of the Middle and Ring-finger.*

Flexor sublimis      Extensor communis

Flexor profundus      Lumbricalis

*Muscles inserted into the Phalanges of the Little-finger.*

Flexor sublimis      Extensor communis

Flexor profundus      Auricularis

Flexor brevis      Abductor minimi digiti

Lumbricalis      Adductor minimi digiti

## OF THE PELVIS.

To connect the lower extremities with the trunk by a sure and firm joining, the pelvis is interposed. It may be defined as a large deep cavity, situated at the inferior extremity of the vertebral column, and destined to support and contain the urinary and genital organs, and also numerous important blood-vessels, nerves, and lymphatics. It is composed of four bones; two ossa innominata, os sacrum, and os coxale.

*The os innominatum*, in children, consists of three pieces, united by cartilage: in the adult, these three

portions are consolidated into one large irregular bone: anatomists still, however, mark out the three different portions, and distinguish them by different names, as if they were three distinct bones. Of these three portions, the largest is superior and lateral, called os ilium; the second, inferior, called os ischium; and the third and smallest, anterior, os pubis.

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## OF THE ILIUM.

The Ilium forms the superior and lateral part of the pelvis; in shape, irregular. We may observe in each bone, an external surface and an internal surface, a superior, anterior, and posterior margin.

*The external, dorsal, or femoral surface* is unequally convex anteriorly, and posteriorly somewhat excavated. It is also marked by several asperities, and by a semi-circular ridge. *The internal or femoral surface* is concave, and forms the fossa iliaca, bounded inferiorly by a raised line (*linea ilio-pectinea*). *The superior margin* passes in an arch direction backwards, and forms the crest (*crista ili*), and is divided into an external and internal lip (*labium externum et internum*). *The anterior margin* presents two processes, the anterior superior, the anterior inferior spinous process, and between the two a notch (*incisura semilunaris*). *The posterior margin* is shorter and thicker than the anterior margin, it terminates likewise in two processes, the posterior superior, and posterior inferior spinous process.

*The inferior and anterior portion* of the bone is thickest, and assists in forming the cotyloid cavity (*acetabulum*). *The posterior and internal portion* offers a triangular deeply indented surface, for connexion with the sacrum, and below it assists in forming the superior and posterior portion of the great sciatic notch (*incisura iliaca superior*).

*Foramina* for nutritious vessels are placed both externally and internally.

*Connexions*.—It is connected with the sacrum by synchondrosis; with the ischium and pubis by synostosis.



## OF THE ISCHIUM.

The Ischium constitutes the lowest and lateral parts of the pelvis, and is of very irregular figure: we may divide it into its body and ramus.

The *upper part of the body (corpus)* forms the lower and greatest part of the cotyloid cavity; the *inferior portion* is expanded and rounded, constituting the tuberosity (*tuber ischii*); between the two portions the bone is contracted, forming the neck, and is grooved by the obturator externus muscle. The *posterior border* is divided into two parts by the spine; the spine passes backwards on a line with the acetabulum; below the spine the bone is hollowed for the passage of the obturator internus muscle; it also assists in forming the lesser sciatic notch (*incisura iliaca inferior*). The *internal surface* on the lower margin of the tuberosity offers a deep groove for the passage of the internal pudic vessels and nerves

The *ramus* passes from the tuberosity obliquely upwards and forwards, and joins the descending ramus of the pubis. The *external and internal surface* of the ramus are flat; the *anterior and inner margin* enters into the formation of the pubic arch; the *external and posterior margin*, the obturator opening.

*Connexions.*—The ischium is joined to the ilium and pubis by synostosis.

## OF THE OS PUBIS.

The Pubis constitutes the anterior part of the pelvis; it may be divided into an horizontal and descending ramus.

The *outer part of the horizontal plate* forms the inner fifth of the acetabulum; the *superior surface* is flattened and constitutes the superior boundary of the crural arch, and is grooved by the femoral vessels; the *posterior margin* presents a sharp ridge, the linea ilio-pectinea; the *anterior margin* forms the upper boundary of the obturator foramen, and *inferiorly* is obliquely notched for

the obturator vessels. *The internal and anterior part is flat and compressed. The point of junction between this portion and its fellow, is termed the symphysis; the superior margin (above the symphysis) about an inch in extent, is termed the crest; about three quarters of an inch from the symphysis, somewhat anterior, a strongly marked spine is placed, giving a point of attachment to the lower pillar of the external abdominal ring. The descending ramus is that portion of the bone which passes downwards and outwards, and joins the ascending ramus of the ischium. The internal surface is smooth and flat; the external surface rough and irregular for the attachment of muscles. The internal margin concurs to form the pubic arch; the external margin, thin and flat, enters into the formation of the obturator opening.*

*Connexions.*—The ossa pubis are connected with the ossa ilii and ischii by synostosis, and with each other by synchondro-symphysis.

*Muscles arising from the Ossa Ilii.*

<i>From the cristæ.</i>	Obliqui interni abdominis Transversales abdominis Quadrati lumborum Latissimi dorsi Sacro Lumbales Longissimi dorsi
<i>From the external surfaces</i>	Glutæi maximi, medii, et minimi
<i>From internal surfaces</i>	Iliaci interni
<i>From anterior inferior spinous processes</i>	Recti femoris
<i>From superior spinous processes</i>	Tensores vaginæ femoris Sartorii

*Inserted into the ossa ilii.*

<i>Into the linea ilio-pectinea</i>	Psoæ parvi
<i>Into the crests of the ilium</i>	Obliqui abdominis externi

*Muscles arising from the Ossa Ischii.*

<i>From the spines</i>	Levatores ani Superior gemelli
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<i>From the tuberosities</i>	Coccygei Quadrati femoris Bicipites Semitendinosi Inferior gemelli Semimembranosi Transversi perinæi
<i>From the tuberosities and rami ascendentes</i>	Transversales perinæi alteri Erectores penis Obturatores externi Graciles Tricipites Erectores clitoridis Obturatores interni

*Muscles arising from the Ossa Pubis.*

<i>From the horizontal plates and obturator margins</i>	Pectinales Recti abdominis Pyramidales Obturatores externi Obturatores interni Levatores ani
<i>From the rami</i>	Tricipites Graciles

*Muscles inserted into the Ossa Pubis.*

<i>Into symphysis, spines, and crest</i>	Obliqui abdominis interni et externi Transversales abdominis
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## OF THE SACRUM.

The sacrum is situated at the posterior part of the pelvis, *between* the ossa ilii, *above* the os coxale, and *beneath* the vertebral column. It is sometimes considered as the base of the spine, and from this cause some anatomists have enumerated the os sacrum and os coxale with the vertebræ, calling them false vertebræ. It is of a triangular shape, expanded above, contracted below: it may be divided into two surfaces, two borders, and into its base and apex.

*The posterior or spinal surface* is convex, and marked in the centre by several small projecting processes, termed the spines; sometimes they form one continued ridge: beneath them the sacral canal terminates in a triangular space open behind, but depended by a strong ligamentous expansion, the sacro-coccygeal ligaments, and bounded on either side by a bifid process (*cornua sacralia*): under this process, on either side, a foramen passes, for the passage of the posterior branches of the last sacral nerves. On either side of the spines the posterior sacral foramina are placed, five pairs in number, filled up partly by ligament; these openings transmit the posterior divisions of the sacral nerves.

*The anterior surface* is smooth and concave, and marked by four transverse lines indicating the original division of the bone into five parts. On the sides are four pairs of foramina and a notch inferiorly completed into a fifth foramen by ligament; sometimes, it forms an osseous foramen common to it and the os coxale. Passing outwards from these foramina may be observed some superficial grooves indicating the course of these nerves, and between these grooves the pyriformes muscles take their origin.

*The lateral margins* present two large, broad, indented, triangular surfaces, invested with cartilage superiorly, by which the bones are connected to the ossa ilii.

*The base* is expanded, of an oval shape transversely, and corresponds with the body of the last lumbar vertebræ: on either side are two processes forming the transverse spines; posteriorly, two articular processes, hollow, and facing towards each other, corresponding with the inferior ones of the last lumbar vertebræ.

*The apex* is directed downwards and connected with the os coxale. The sacrum where it joins the body of the last lumbar vertebræ forms a projecting angle, termed the promontory (*promontorium*). The sacral canal is continued with the vertebral canal and is of triangular shape.

*Connexions.*—It is connected *superiorly* to the last lumbar vertebra; *inferiorly* to the os coxale; and *laterally* with the ossa innominata by means of cartilage and ligaments.

*Use.*—It forms the base of the trunk, and also affords a powerful defence for the pelvic contents

*Muscles arising from the Sacrum.*

Latissimi dorsi	Longissimi dorsi
Obliqui abdominis interni	Sacro-lumbales
Glutæi maximi	Pyriformes

## OF THE OS COXALE, VEL OSSA COXALIA

The Os Coxale is situated immediately below the sacrum: in shape it resembles an inverted pyramid. This bone in the infant consists of three or four parts, which in the adult is found generally united into one bone.—*The anterior surface is smooth and concave; the posterior surface convex; the base is united to the apex of the sacrum; the apex is free and inflected forwards and inwards.*

*Use.*—To form the posterior and inferior portion of the pelvis and to support the intestinum rectum.

*Muscles arising from the Os Coxale.*

Glutæi maximi.

*Muscles inserted into the Os Coxale.*

Coccygei	Sphincter ani
Levatores ani	

## OF THE PELVIS IN GENERAL.

The Ossa Innominata Sacrum and Os Coccygis articulated together form the cavity termed the Pelvis; and as a whole it may be divided into two circumferences and four regions.

*The anterior region* presents, in the middle line, the symphysis pubis, the pubic arch, laterally the rami of the pubis, the rami and tuberosities of the ischia, the ob-

turator openings, the horizontal branches of the pubes, with the cotyloid cavities.

*The posterior region* presents the sacrum with its spines, foramina, and sacral canal; the os coxale with its ligaments.

*In the lateral regions*, on either side, are placed the dorsum ilii, and at the lower part, the great sciatic notches.

*Internally* the pelvis has been divided into two parts by the linea ileo-pectinea, into a *superior* or abdominal cavity, and into an *inferior* or true pelvic cavity.

*The abdominal cavity* is bounded on either side by the fossa iliaca and crest of the ilium; *posteriorly*, by the promontory of the sacrum; and *anteriorly* by the anterior spinous processes of the ilium, by the crural arch, and abdominal muscles.

*The true pelvic cavity* is bounded in front by the ossa pubis; laterally by the ossa ischii; *posteriorly* by the sacrum and os coccygis, and ischiatic notches.

The pelvis offers *two circumferences*, an upper and lower.

*The upper circumference* is inclined upwards and forwards, and is marked out by the crests of the ilium, promontory of the sacrum, crest and tubercles of the pubis.

*The lower circumference*, or aperture, is much more contracted; it extends between the sacrum, ossa coxalia, and ossa ischia, and looks downwards and backwards.

### *Parts formed by the union of the Bones of the Pelvis.*

*The acetabula or cotyloid cavities.*—They are of hemispherical shape, of about two inches in diameter, situated inferiorly, and on the external surface, where the three bones unite, and are turned obliquely outwards. Each cavity is formed in the following proportions by the os innominatum, viz.: the ilium rather less than two fifths, the ischium rather more than two fifths, the pubis one fifth. *The margin* is very prominent, but it does not form an entire circumference, but is gradually depressed anteriorly and inferiorly; opposite the obturator foramen it is altogether interrupted by a deep notch for the passage of the vessels supplying the joint.

*The cavity* is invested with cartilage, but it is wanting towards the notch on the inner and lower part,—here the ligamentum teres is directly implanted into the bone.

*The obturator foramen.*—The obturator foramen, on either side is a large oval aperture, formed by the union of the os ischium and os pubis. At its superior margin it presents an oblique notch for the passage of the obturator vessels and nerves. The two obturator muscles and ligaments completely cover this aperture.

*The ischiatic notches* are two large irregular cavities, situated posteriorly, bounded by the ilium above, by the ischium in front and below, by the external border of the sacrum and os coxale posteriorly, and are divided into two portions by the sacro-sciatic ligaments.

*The superior* or greater sciatic notch on either side, gives passage to the pyriformes muscle, the gluteal, ischiatic and internal pudic vessels and nerves.

*By the inferior* or lesser sciatic notch, the obturator internus muscle leaves the pelvis, and the internal pudic vessels and nerves re-enter that cavity.

### *Differences between the Male and Female Pelvis.*

The male pelvis is strong, with small cavities and narrow openings: the female pelvis is shallower and wider in all its dimensions, the bones are lighter and more slender. The ossa ilii are spread out, and thus the enlarged uterus is better supported. The brim of the pelvis is more elliptical, approaching less to a circle than in the male. The size of the notch in the ilium, and also the obturator foramen are much larger in the female; from this circumstance the breadth of the pelvis is greatly increased; the angle of the vertebræ recedes also to a greater distance backwards; the os coxale is more loose, and hence during parturition it may be pushed backwards, which considerably enlarges the inferior aperture. The tuberosities of the ischia are placed more outwardly, thus the inferior aperture is rendered larger. The ossa pubis in the male form, by their junction, an acute angle, but in the female the angle is wider considerably. In short, the cavities and outlets of the pelvis are broader and wider in all their dimensions.

The capacity of the pelvis is measured by four diameters:—1st. the *sacro-pubic*, from the sacrum to the inner surface of the symphysis pubis; 2nd. the *iliac*, from one ilium to the other, transversely, intersecting the preceeding at right angles; 3rdly. *two oblique*, measured from the cotyloid wall of one side, to the sacro-iliac symphysis on the other. The dimensions are thus given by Mekei:—

	<i>Male Pelvis.</i>		<i>Female Pelvis.</i>	
	in. lines		in. lines	
Between the anterior superior spinous processes of the ossa ilii, transversely	7	8	8	6
From the middle of one crista to the same point on the opposite side ... ..	8	3	9	4
Iliac diameter of the inlet ... ..	4	6	5	0
Oblique diameter of the inlet ... ..	4	5	4	5
Sacro-pubic diameter of the inlet ... ..	4	0	4	4
Iliac diameter of the true cavity ... ..	4	0	4	8
Oblique diameter of the true cavity ... ..	5	0	5	4
Sacro-pubic diameter of the true cavity	5	0	4	8
Transverse diameter of the outlet ... ..	3	0	4	5
Oblique diameter of the outlet ... ..	3	0	4	6
Sacro-pubic diameter of the outlet ... ..	3	3	4	4

## OF THE INFERIOR EXTREMITIES.

The inferior extremities have been commonly divided into three parts, viz:—the thigh, leg, and foot.

### OF THE OS FEMORIS.

The Os Femoris is the longest bone of the body, it is the most cylindrical and the strongest, it is situated between the acetabulum and tibia, it is not placed perpendicularly but inclines obliquely inwards. It may be divided into its two extremities and body.

The *superior extremity* presents the following parts: the head (*caput*), the neck (*cervix ossis femoris*), and the two trochanters (*trochanteres*).

#### *The head*

Forms a considerable segment of a sphere, is directed upwards and



nwards, and closely articulated with the acetabulum. It is smooth, and invested with cartilage, excepting in the centre or the inner part, here may be observed a small depression into which the round ligament is inserted.

*The neck.*

The neck of the bone is placed immediately under the head, smaller above than below, and passes downwards and outwards. The direction is more or less oblique, and the position of the head is consequently various, as a more or less obtuse angle is formed. This angle varies at different periods of life, in the aged subject the head frequently sinking below the level of the trochanter major. The neck is rough for the attachment of the capsular ligament, and perforated by numerous foramina for the transmission of small blood vessels.

*Trochanter major*

Represents the direct end of the bone, and is a large quadrilateral process, and placed a little below the level of the head. At the base, *internally*, there is a deep depression, (*fovea trochanterica*), for the insertion of the small rotator muscles.

*Trochanter minor*

Is of pyramidal shape, and is placed posteriorly at the base of the neck below the level of the great trochanter. Between the trochanters posteriorly, there is an oblique line (*linea quadrata*) at the base of the neck. There is likewise a line anteriorly (*linea trochanterica anterior*).

*The body*

Presents two surfaces, an anterior

and posterior. *The anterior surface* is smooth and convex; *the posterior surface* is concave, and marked by a strong ridge, called the *linea aspera*. This ridge commences from the root of each trochanter by a separate line; the two lines unite about the middle third, and form one continued ridge, which, at the lower third, bifurcates to terminate at the two condyles, bounding there a smooth triangular surface of bone, the popliteal space. At the upper part of the middle third the foramen for the nutritious artery of the bone is placed, with an upward direction.

*The inferior extremity* Is expanded, forming two large processes, *the condyles*; the outer condyle is the largest, the inner the longest. The external is rough for the attachment of the external lateral ligament. The internal offers a tuberosity for the insertion of the tendon of the adductor magnus. *Between* the condyles, anteriorly, is a smooth depressed surface, for the patella (*fovea intercondylöidea anterior*); posteriorly, a deep notch for the popliteal vessels (*fovea intercondylöidea posterior*). Above the condyles, the bone is rough for the attachment of the capsular ligament. *Inferiorly* the condyles are covered with cartilage, forming an articulating surface; this surface extends considerably backwards.

*Connexions*—It is connected above by enathrosis with the os innominatum: below, by angular ginglymus with the tibia and the patella.

*Muscles arising from the Os Femoris.*

*From the convex surface of Crureus  
the body*

*From linea aspera*

**Vastus internus**

**Vastus externus**

**Biceps flexor cruris**

*From external condyle*

**Popliteus**

**Plantaris**

*From external and internal condyles*

**Gastrocnemius externus**

*Muscles inserted into the Os Femoris.*

*Trochanter major*

**Gluteus medius**

**Gluteus minimus**

*Trochanter minor*

**Psoas magnus**

**Iliacus internus**

*Root of trochanter major*

**Pyriformis**

**Gemelli**

**Obturator externus et internus**

*Linea quadrata*

**Quadratus femoris**

*Outer border*

**Gluteus maximus**

*Inner border*

**Pectinalis**

**Triceps abductor femoris**

*The Leg is composed of three bones, the Patella, Tibia, and Fibula.*

## OF THE PATELLA.

The Patella is placed between the condyles of the os femoris of unequally triangular shape, it may be divided into its base, apex, anterior and posterior surface. *The anterior surface* is convex and rough and gives attachment to tendinous aponeuroses; *the posterior surface* is smooth and invested by cartilage and the synovial membrane, and is divided into two surfaces by an oblique ridge; the external is the largest. *The base* is inclined upwards and gives attachment to the extensor tendons, *the apex* downwards towards the tubercle of

the tibia, to which it is connected by a remarkably strong ligament.

*Use.*—It defends the knee joint anteriorly, it also serves as a pulley for the tendons of the extensors of the leg.

*Connexions.*—It is connected to the tibia by synéu-rosis, to the femur and tibia by angular ginglymus.

*Muscles inserted into the Patella :*

Rectus femoris  
Cruræus

Vastus internus  
Vastus externus

## OF THE TIBIA.

The Tibia is a long thick triangular bone, situated at the inner and anterior part of the leg, continued in almost a straight line with the femur. It is divided into a body, superior and inferior extremities.

*Superior extremity* is expanded and transversely oval ; it presents, on its *upper surface*, two articulating depressions lined with cartilage ; the internal oval, the external circular (*cavities glenöideæ*), separated from each other by a projecting process, termed the spine.—Anterior and posterior to the spine, are two depressions uncovered by cartilage, for the attachment of the crucial ligaments. *The anterior surface* is of triangular shape, the base being above ; the apex below, where it forms a projecting process termed the tuberosity (*tuberositas tibiæ*). *The posterior surface* is depressed, forming the popliteal notch, and also rough for the attachment of muscles. *Externally*, the bone offers a slightly convex surface, receiving the head of the fibula ; *internally*, it is marked for the attachment of the semimembranous muscle. *The body* is of triangular shape, it presents three angles, three surfaces. *An anterior angle* acute above, forming the spine, rounded inferiorly ; *a posterior internal angle*, rounded and extended downwards to the inner maleolus ; *a posterior external angle*, sharp for the attachment of the interosseous ligament. The angles bound the three surfaces. *The internal surface* is smooth and convex, merely covered by the integuments

and periosteum, and is placed between the anterior and posterior internal angle. *The external surface* is concave at the upper part, receiving the tibialis anticus, rounded inferiorly, and is placed between the anterior and posterior external angle. *The posterior surface* is broader, and is placed between the two posterior angles, and is rough for the attachment of muscles; in about the upper third of this surface the foramen directed downwards and forwards for the nutritious vessels may be observed. *The inferior extremity* is of a quadrilateral shape, anteriorly convex and advancing forwards to support the capsular, and tibio-tarsal ligaments; posteriorly flattened and grooved for the tendon of the flexor longus pollicis; internally lengthened by a triangular process, termed the internal malleolus; externally notched and invested by cartilage for connexion with the fibula; lastly, *the anterior surface* is concave and invested by cartilage, deeper on the inner than on its outer side, and articulates with the head of the astragalus.

*Connexions.*—It is connected with four bones: *above*, with the os femoris and patella, by angular ginglymus; with the fibula, by arthrodia and syneurosis; *inferiorly*, with the astragalus, by angular ginglymus.

#### *Muscles inserted into the Tibia :*

<i>Internal and anterior surface superiorly</i>	Semimembranosus
	Semitendinosus
	Gracilis
	Sartorius
<i>Posteriorly and superiorly</i>	Popliteus

#### *Muscles arising from the Tibia :*

<i>From anterior surface</i>	Tibialis anticus
	Extensor longus digitorum
<i>From posterior surface</i>	Gastrocnemius internus
	Tibialis posticus
	Flexor digitorum profundus

## OF THE FIBULA.

The Fibula is a long slender bone, placed on the outer

side of the leg and somewhat posteriorly, almost opposite the external and posterior angle of the tibia. In shape, rounded superiorly; triangular inferiorly. It is divided into its body and two extremities.

*The superior extremity* is rounded and forms the head (*capitulum*), invested with cartilage. *The head* is slightly concave, directed inwards and forwards, and joins the external margin of the tibia. The outer surface is rough for the insertion of the biceps and external lateral ligament. Below the head a neck is sometimes described.

*The body*.—The internal surface is divided by a longitudinal ridge, which gives attachment to the interosseous ligament; and, by this ridge, into an *anterior* and *posterior* portion. *The external surface* is grooved, and looks forwards; and below, backwards.

*The posterior surface* is directed a little outwards above, at the lower part, inwards; is marked by the attachment of muscles, and presents in its middle part a foramen, directed forwards and downwards, for the nutritious vessels.

*The body* presents three borders, an anterior, an internal, and an external.

*The inferior extremity* is elongated, and terminates in a pyramidal process, called the outer malleolus, which is larger and descends lower than the internal. The malleolus *externally* is rough for the attachment of ligaments; *internally* it is invested with cartilage, smooth, and rests against the astragalus; *above* it presents a triangular surface, by which it is connected with the tibia. *Posteriorly* it is grooved for the tendons of the peroneus longus and brevis; *anteriorly* it is marked by the attachment of ligaments.

*Connexions*.—It is connected to the tibia by arthrodia and syneurosis; to the astragalus by arthrodia.

#### *Muscles arising from the Fibula.*

*From the external border and posterior surface* Gastrocnemius internus  
Peroneus longus  
Peroneus brevis

Flexor longus pollicis

*From the anterior border and anterior portion of the anterior surface* Extensor longus pollicis  
Extensor digitorum longus  
Peroneus tertius

*From the posterior surface Tibialis posticus  
and posterior portion of  
the anterior surface*

*Muscles inserted into the Fibula.*

Biceps flexor cruris

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## OF THE BONES OF THE FOOT.

The Foot is composed of the Tarsus, Metatarsus, and Toes,

### OF THE TARSUS.

The Tarsus is placed between the tibia and metatarsus, and consists of seven bones, viz.—the astragalus, the os calcis, the os naviculare, the os cuboideum, and the three ossa cuneiformia.

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### OF THE ASTRAGALUS.

The Astragalus is somewhat of a cubical form, and occupies the superior part of the tarsus; it presents six surfaces. *The superior surface* in front is contracted and rough for attachment of ligaments, posteriorly convex, and covered with cartilage, and this portion is received into the cavity formed by the lower end of the tibia. *The inferior surface* is concave and offers two separate articulating surfaces, for connexion with the os calcis; the posterior, the largest, is concave—the anterior and internal is convex. *The external surface* rests against the fibula; *the internal* superiorly articulates with the tibia; inferiorly, is rough without cartilage, and gives attachment to ligaments. *The anterior surface* is convex, rounded, forms the head, and is received into the concavity of the scaphoid. *The posterior surface* is narrow and crossed by a groove, for the tendon of the flexor longus pollicis,

*Connexions.*—*Above*, it is connected by angular ginglymus to the tibia and fibula; *below*, by arthrodia, to the os calcis; *anteriorly*, to the scaphoid.

*Muscles arising from the Astragalus.*

Extensor brevis digitorum pedis.

## OF THE OS CALCIS.

The Os Calcis is placed posteriorly, is the largest bone of the tarsus, and forms its basis. *The superior surface* is divided into two portions; the posterior, which is unequal, and the anterior, which is convex and covered by cartilage, and articulated by two surfaces with the astragalus. *The inferior surface* is narrow, and posteriorly presents two tubercles, of which the inner is the largest. *The internal lateral surface* is a little excavated, for the passage of blood vessels, nerves and tendons. *The external lateral surface* is covered only by ligaments and the common integuments, and is grooved for the tendons of the peronei. *The posterior surface* is convex, smooth above, rough and irregular below for the attachment of the tendo Achilles. *The anterior surface* is somewhat triangular, partly concave, and connected to the os cuboides.

*Connexions.*—It is connected with astragalus and os cuboides.

*Muscles arising from Os Calcis.*

<i>From the dorsum</i>	Extensor brevis digitorum
<i>From the under surface</i>	Flexor brevis digitorum pedis
	Flexor brevis pollicis
	Flexor accessorius
	Adductor pollicis
<i>From inner border</i>	Abductor pollicis
<i>From outer border</i>	Abductor minimi digiti

*Muscles inserted into the Os Calcis.*

Gastrocnemius externus	Plantaris
Gastrocnemius internus	



## OF THE OS NAVICULARE, OR OS SCAPHÖIDEUM.

The Os Naviculare occupies the middle and inner part of the tarsus. *The posterior surface* is concave, covered with cartilage, and receives the convex surface of the astragalus. *The anterior surface* is convex, and divided into three smaller cartilaginous surfaces, for connexion with the ossa cunëiformia. *The inner border* terminates in an obtuse point; *the outer border* joins the os cuböides.

**Connexions.**—It is connected to the astragalus, three cuneiform bones, and os cuböideum.

*Muscles inserted into the os naviculare,*  
*Tibialis posticus.*

## OF THE OS CUBÖIDEUM.

The Os Cuböideum is placed at the external side of the tarsus: it offers six surfaces. *A superior surface*, flat and rough, and covered by the extensor brevis; *an inferior surface*, grooved for the passage of tendon of the peroneus longus; *a posterior surface*, which is cartilaginous, broad, partly convex, partly concave, receiving the os calcis; *an anterior surface*, divided by a line, receives the fourth and fifth bones of the metatarsus; *an external surface*, grooved for the tendon of the peroneus longus; *lastly an internal surface*, which presents articulating surfaces for connexion with the os scaphöideum and cunëiforme externum.

**Connexions.**—It is connected to the os calcis to the fourth and fifth metatarsal bones, to the scaphoid, and external cuneiform bones.

*Muscles arising from Os Cuböideum.*

Adductor pollicis pedis	Flexor brevis pollicis pedis
Flexor brevis minimi digiti	

*Muscles inserted into the Os Cuböideum.*

Peroneus brevis	Peroneus tertius.
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## OF THE THREE OSSA CUNEIFORMIA.

The three Cuneiform bones constitute the most anterior part of the tarsus. We may divide each bone into its base, apex, and four surfaces.

*The first*—the cunëiforme internum is the largest; *the base* is convex and turned downwards; *the apex* is turned upwards towards the dorsum of the foot; *the posterior surface* is concave, and united with the scaphoid; *the anterior surface*, which is semilunar, supports the first bone of the metatarsus; *the internal lateral surface* is unconnected; *the external lateral surface* is connected above to the second cuneiform bone, and below to the second bone of the metatarsus.

*The second*—the cunëiforme medium is the smallest: *the basis* is turned upwards; *the apex* downwards; *the posterior surface* is triangular, and connected to the middle surface of the scaphoid; *the anterior surface* supports the second metatarsal bone; *the internal lateral surface* joins the cunëiforme internum; *the external lateral surface* is connected with cunëiforme externum.

*The third*—the cunëiforme externum: *the basis* is turned upwards towards the dorsum of the foot; *the apex* downwards; *the posterior surface*, which is triangular, is joined to the external anterior surface of the scaphoid; *the anterior surface*, which is also triangular, receives the third bone of the metatarsus; *the internal lateral surface* joins the cunëiforme medium; *the external lateral surface* is connected with the cuböides.

*Muscles arising from the Ossa Cunëiformia.*

Flexor brevis pollicis

Adductor pollicis

*Muscles inserted into the three Ossa Cunëiformia.*

Into internal cuneiform bone Tibialis anticus

Peroneus longus

Into internal and middle cuneiform bone Tibialis posticus

## OF THE METATARSAL BONES.

The Metatarsus is the second division of the foot, and consists of five bones: we may observe in them *the superior surface*, which is convex and assists in forming the dorsum of the foot; an inferior surface concave, forming an arch; *two lateral margins*; *an anterior margin*, joining the phalanges; and a *posterior margin*, united to the tarsus.

Each of these five bones is divided into its body, *posterior* and *anterior* extremities.

*The posterior extremities* are triangular, excavated, covered by cartilage, and joined to the bones of the tarsus; *the anterior extremities* are called the heads, are rounded, smooth, and convex, and are articulated with the first phalanges.

*The body* has three surfaces and three angles; a superior surface, convex; and two lateral surfaces.

The metacarpal bones differ greatly from one another.

*The first metatarsal* is the thickest and shortest: on the under surface of the head are two depressions receiving the ossa sessamöidea. It is articulated with the first phalanx of the great toe and os cunëiforme internum.

*The second metatarsal* is the longest; the posterior extremity is triangular and wedged in between the cuneiform bones.

*It articulates with six bones*; posteriorly with the os cunëiforme medium; laterally, with the os cunëiforme externum and internum and with the first and third metatarsal bones; and anteriorly with the first phalanx of the second toe.

*The third metatarsal bone* is smaller than the second, and the posterior extremity narrower. It articulates with the os cunëiforme externum, with the metatarsal bones of the second and fourth toes, and with the first phalanx of the third toe.

*The fourth metatarsal* is broader and shorter than the third; posteriorly, it joins the os cuböideum, the os cunëiforme externum, the metatarsal bones of the third and fifth toe; with the first phalanx of the fourth it is connected anteriorly.

*The fifth metatarsal* may be at once distinguished, it is the shortest; the posterior extremity is transversely

broader and very oblique ; it terminates in a tuberosity which projects beyond the plane of the tarsal bones. It articulates with the os cuboïdeum and with the metatarsal bone of the fourth toe ; anteriorly, it is connected with the first phalanx of the outer toe.

The metatarsal bones are connected to the tarsus and first phalanges by arthrodia.

## OF THE TOES.

The Toes form the third division of the foot, and are placed at the anterior margin of the metatarsus. They are composed of fourteen bones ; three phalanges to each toe, excepting the great toe, which possesses only two. The phalanges are classed into *posterior, middle, and anterior row*.

*The posterior* are the longest, *the anterior* the shortest, excepting that of the great toe, which is of considerable size. Their figure and division in description presents the same characters as that of the fingers.

They are connected by arthrodia to the metatarsus ; with each other, by angular ginglymus.

*The ossa sessamöidea* are found at the base of the great toe, they form a groove for the tendon of the flexor longus pollicis.

### *Muscles attached to the bones of the Metatarsus :*

<i>Inserted into the first metatarsal</i>	Tibialis anticus Peroneus longus Adductor pollicis pedis Transversalis
<i>Into the middle metatarsal</i>	Tibialis posticus
<i>Into the fifth</i>	Peroneus brevis Peroneus tertius Flexor brevis minimi digiti Abductor minimi digiti Interossei

### *Muscles connected with the Phalanges.*

<i>With the great toe</i>	Flexor longus pollicis Flexor brevis pollicis
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*With the little toe*

Extensor proprius pollicis  
Adductor pollicis pedis  
Abductor pollicis pedis  
Flexor brevis minimi digiti  
pedis  
Abductor minimi digiti pe-  
dis

*With the phalanges of all  
the toes*

Adductor minimi pedis  
Flexor longus digitorum  
pedis profundus  
Flexor brevis digitorum pe-  
dis sublimis  
Lumbricales  
Extensor longus digitorum  
pedis  
Extensor brevis digitorum  
pedis  
Interossei

## SYNDESMOLOGY.

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THE bones of the skeleton are united to each other: their mode of union varies: it is, however, expressed by the general term *articulation*. The connecting media are cartilage, fibro-cartilage, synovial apparatus, and fibrous membranes variously arranged, termed ligaments. Articulations are of three kinds—moveable, immoveable, and mixt. The articulation with sensible motion, is termed diarthrosis (Διὰ, per; ἄρθρον articulus), an articulation separate, between contiguous surfaces. There are three kinds of diarthrosis.

1. Enarthrosis (ἐν, in; ἄρθρον articulus)
2. Arthrodia (αρθρωδία)
3. Ginglymus (Γιγγλυμος cardo)

### *Enarthrosis*

Or ball and socket joint, is that articulation in which the great head of one bone is received into the cavity of another.

### *Arthrodia*

Differs from the preceding only in the cavity being more superficial; or, according to Vesalius, "it is that articulation of two bones adapted for motion, where it is not, at first sight obvious which of the two has the head or cavity, or where they are joined by plain surfaces."

**Ginglymus** Properly signifies a hinge, is that articulation where the bones receive and are received by each other, and when their motion is reciprocal on each other, resembling a hinge.

Ginglymus is again distinguished into angular, lateral, and trochoid.

**Angular ginglymus** When one bone in moving makes an angle with another.

**Lateral ginglymus** When the motion is lateral

**Trochoid** When one bone turns upon another, as a wheel does upon its axis

The immoveable articulations are termed *synarthroses* (*Συν, cum; αρθρον, articulus*). Under this class may be included,

1. Suture (*sutura, a seam*)
2. Harmony (*αρα adapto*)
3. Schindylesis (*Σχινδύλεσις calami fissura*)
4. Gomphosis (*Γομφος clavus*)

**Suture** Is that articulation where bones are indented into each other, putting on the resemblance of a seam.

**Harmony** Differs from suture, in that the inequalities are small; the union representing only a kind of line

**Schindylesis** Implies that a plate of bone is received into a groove of another bone

**Gomphosis** Is the fixing of one bone into another, as a nail is fixed in a board

The third general kind of articulation partakes of both the former two, the moveable and immoveable, and hence it is termed *amphiarthrosis* (*αμφι, utrinque; αρθρον, articulus*); the mixed articulation.

The aggregate of the means by which the connection

of the bones is effected, is what is called *symphysis*\* (*Συνφυσισ συν cum quæ eresco*). *Symphysis* is either with or without a medium.

The connexion or *symphysis* of bones, with a medium, is of three kinds:

1 *Syneurosis* (*Συν, cum; νευρον, nervus*); connexion by ligament.

2 *Synchondrosis* (*Συν, cum; χονδρος, cartilago*); connexion by cartilage.

3 *Syssarcosis* (*Συν, cum; σαρξ, caro*); connexion by muscle.

By Bichat the motion of joints has been divided into four kinds: opposition, circumduction, rotation, gliding.

<i>Opposition</i>	Is the motion which is performed in two opposite directions; for instance; from flexion to extension; from abduction to adduction. This motion is general or limited.
<i>Circumduction</i>	Is the motion by which the bone describes a kind of cone, the summit of which is in the superior articulation; the basis in the inferior.
<i>Rotation</i>	Differs from the preceeding motion: here the organ remains in the same situation; it only turns on its axis.
<i>Gliding</i>	Is that motion by which two surfaces meet in a reverse direction, by gliding as it were, one over the other.

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\* *Symphysis* properly signifies the growing together of parts: when used to express the articulation of bones, it does not seem to comprehend, under the meaning generally given to it, any thing relating to form or motion of conjoined bones; and as the different modes of connection are expressed in clearer terms, it might, with propriety, be discarded.



## OF THE ARTICULATIONS.

## ARTICULATIONS OF THE VERTEBRAL COLUMN.

*Articulation, Class,  
and Division*

*Ligaments.*

*Articulation of the bodies of the vertebræ.* An anterior and posterior vertebral ligament (*ligamentum commune anterius et posterius vertebrarum*);

*cl. Amphiarthrosis.* crucial ligaments (*ligamenta cruciata*); the intervertebral ligaments or fibro cartilages (*ligamenta intervertebralia*)

*Arches of the vertebræ.* A peculiar ligament (*Ligamenta subflava*)

*cl. Synchrosis.*

*Articular processes.* Cervical, inter-spinous inter-transverse ligaments synovial capsules.

*cl. Diarthrosis.*

*div. Arthrodia.* (*Ligamenta inter-spinosa et inter-transversalia, et membranæ synoviales*)

*Motion.*—Flexion, extension, lateral motion, and some degree of rotation.

*Articulation of the head with the atlas.* An anterior and posterior annular and capsular ligament, synovial membrane. (*Ligamentum capsulare, et annuli anterioris et posterioris atlantis, membrana synovialis*)

*cl. Diarthrosis.*

*div. Arthrodia.*

*Motion.*—Very slight

*Vertebra dentata and os occipitis.* Two lateral and perpendicular ligaments. (*Ligamenta alaria et ligamentum perpendiculare*)

*cl. Synchrosis.*

*Atlas with vertebra dentata.* Transverse ligament and synovial capsules. (*Ligamentum transversale et membranæ synoviales*)

*cl. Diarthrosis.*

*div. Arthrodia.*

*Motion.*—Rotation.

## ARTICULATION OF THE LOWER JAW.

The inferior maxillary bone forms a double articulation with the temporal bone, the condyloid processes of the former being received into the condyloid fossæ of the latter.

*Temporo-maxillary.*  
*cl. Diarthrosis.*  
*div. Arthrodia.*  
(double)

External and internal lateral and stylo-maxillary ligaments and inter-articular cartilage and synovial membrane. (*Ligamentum laterale internum et externum, ligamentum stylo-maxillare; cartilago inter-articularis et membrana synovialis*)

*Motion.*—Upwards and backwards, downwards and forwards and lateral motion.

## ARTICULATION OF THE CLAVICLE TO THE STERNUM.

*Sterno-clavicular.*  
*cl. Diarthrosis.*  
*div. Arthrodia.*

An anterior posterior and rhomboid ligament, an inter-clavicular ligament, inter-articular cartilage and synovial membrane. (*Ligamentum anterius et posterius, ligamentum costo-claviculare, ligamentum transversum, cartilago inter-articularis, membrana synovialis*)

*Motion.*—Upwards and downwards, backwards and forwards.

## ARTICULATION OF THE CLAVICLE WITH THE SCAPULA.

*Scapulo-clavicular.*  
*cl. Diarthrosis.*  
*div. Arthrodia.*

Anterior and posterior ligament, inter-articular cartilage, synovial membrane

(*Ligamentum acromio-claviculare superius et inferius, cartilago inter-articularis, membrana synovialis*)

**Motion.**—Slight degree of yielding.

**Coraco-clavicular.** Conoid and trapesoid ligaments  
*cl. Synchrosis.* (*Ligamentum conoideum et trapezoidum*)

**Ligaments proper to the scapula.** An anterior or triangular ligament.  
 Posterior or transverse ligament of the neck—(Sir A. Cooper).—  
 (*Ligamentum graco-acromiale, ligamentum coraco-costoidium, ligamentum cervicis scapulae*)

## ARTICULATION OF THE HUMERUS WITH THE SCAPULA.

**Scapulo-humeral.** Fibrous capsule, synovial capsule,  
*cl. Diarthrosis.* glenoid ligament. (*Ligamentum capsulare fibrosum, ligamentum glenoidium, membrana synovialis*)  
*div. Enarthrosis.*

**Motion.**—Rotation and circumduction.

## ARTICULATION OF THE HUMERUS WITH THE RADIUS AND ULNA.

The elbow joint is formed by the condyles and the humerus above, and by the superior extremities of the radius and ulna below.

**Humero-cubital.** An anterior and posterior ligament.  
*cl. Diarthrosis.* Two lateral and synovial capsules.  
*div. Angular ginglymus.* (*Ligamentum cubiti anterius et posterius. Ligamentum cubiti laterale internum et externum membrana synovialis*)

**Motion.**—Flexion and extension.

## RADIO-ULNAR ARTICULATIONS.

*Radio-ulnar (superiorly).* The coronary ligament, synovial capsule. (*Ligamentum radii annulare, membrana synovialis*)  
*cl. Diarthrosis.*  
*div. Arthrodia.*

*Radio-ulnar (middle).* Interosseous and oblique ligament. (*Ligamentum antibrachii interosseum ligamentum obliquum*)  
*cl. Syneurosis.*

*Radio-ulnar (inferiorly).* Sacciform ligament and an inter-articular cartilage. (*Membrana capsularis sacciformis et cartilago inter articularis*)  
*cl. Diarthrosis.*  
*div. Lateralginglymus.*

*Motion.*—Supination and Pronation.

## ARTICULATION OF THE CARPUS WITH THE METACARPUS.

The Wrist joint is formed by the radius above, by the scaphoid and lunar bones below; the inter-articular cartilage of the ulna is connected with the synovial capsule, and by this means only does the ulna enter into the formation of the articulation.

*Radio-carpal.* An anterior, a posterior, two lateral ligaments, and a synovial capsule. (*Ligamentum radio-carpalis articuli palmare et dorsale, ligamentum radiale et cubitale, membrana synovialis*)  
*cl. Diarthrosis.*  
*div. Arthrodia.*

*Motion.*—Flexion and extension, abduction, adduction, and slight rotatory motion.

## ARTICULATION OF THE BONES OF THE CARPUS.

*Bones of the Carpus.* Dorsal and palmar ligaments, external and internal ligaments, syno-

*cl. Diarthrosis.* vial capsules. (*Ligamenta externa et interna, palmaria et dorsalia membranae synoviales*)  
*div. Arthrodia.*

*Carpo-metacarpal.* Synovial capsules, dorsal and palmar ligaments. (*Ligamenta dorsalia et palmaria, capsulae synoviales*)

**Motion.**—slight degree of yielding.

*Metacarpal bone of the thumb with the trapezium.* A fibrous capsule and synovial membrane. (*Ligamentum capsulare fibrosum et membrana capsularis*)

*cl. Diarthrosis.*  
*div. Arthrodia.*

**Motion.**—Flexion and extension, abduction, adduction.

*Metacarpal bones with each other.* Inter-osseous ligaments. (*Ligamenta interossea*)

*Syneurosis.*

*Metacarpus with Phalanges.* Anterior, posterior, lateral ligaments and synovial capsules.—

*cl. Diarthrosis.* (*Ligamenta anteriora, posteriora, et lateralia, et membranae synoviales*)  
*div. Arthrodia.*

**Motion.**—Flexion, extension, adduction, abduction, circumduction.

*Articulation between the phalanges.* Anterior, posterior, lateral ligaments, synovial capsules. (*Ligamenta anteriora, posteriora, et lateralia, et membranae synoviales*).

**Motion.**—Flexion and extension.

## ARTICULATION OF THE RIBS WITH THE BODIES OF THE DORSAL VERTEBRÆ.

*Costo-vertebral.* An anterior ligament, an inter-articular ligament and synovial capsule. (*Ligamentum capitulorum*)  
*cl. Diarthrosis.*  
*div. Ginglymus.*

*costarum et inter-articulare, et membrana synovialis)*  
**Tubercle of the rib with transverse process of the vertebra.** External transverse ligament, synovial capsule. (*Ligamentum externum transversale, et membrana synovialis*)

cl. *Diarthrosis.*

*Arthrodia.*

**Neck of the rib with transverse process of the vertebra and articular surface.** An external and internal ligament. (*Ligamentum cervicis costarum internum et externum*)

cl. *Syneurosis.*

*Sterno-costal.*

cl. *Diarthrosis.*

div. *Arthrodia*, rather *Synchondrosis.*

An anterior and posterior ligament, and synovial capsule. (*Ligamentum anterius et posterius, membrana synovialis*)

**Motion.**—Upwards and outwards, downwards and inwards.

## ARTICULATIONS OF THE STERNUM.

**Bones of the Sternum.** An anterior and posterior ligament. (*Ligamentum anterius et posterius*).  
 cl. *Syneurosis.*

**Motion.**—Forwards and downwards.

## ARTICULATIONS OF THE PELVIS.

**Sacro-coccygeal.** Anterior and posterior vertebral ligament. (*Ligamentum commune anterius et posterius vertebrarum*).  
 cl. *Amphiarthrosis.*

**Sacro-iliac.** Sacro-iliac ligaments, greater and smaller sacro-schiatic ligaments and synovial capsules. (*Ligamentum sacro-iliacum superius et inferius, ligamentum posticum*)  
 cl. *Synchondrosis.*

*num, vel tuberoso-sacrum, ligamentum posticum breve vel spinoso-sacrum, et membranæ synovialis.)*

*Motion.*—Very slight motion, if any : it may occur from continued pressure during protracted parturition.

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## ARTICULATION OF THE PUBES.

*Pubes.* An anterior posterior ligament and  
*cl. Synchondrosis.* and fibro cartilage. (*Ligamentum  
 anterius et posterius, ligamentum  
 fibro-cartilagineum*)

*Motion.*—Scarcely any motion except under the same circumstances.

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## ARTICULATION OF THE THIGH BONE WITH THE BONES OF THE PELVIS.

The head of the femur is received into the cotyloid cavity of the os innominatum.

*Ilio-femoral.* Fibrous capsule, round ligament,  
*cl. Diarthrosis.* cotyloid ligament, transverse ligament and synovial capsule (*ligamentum capsulare fibrosum, ligamentum teres, ligamentum cotyloideum fibro-cartilagineum, ligamentum transversum et membrana synovialis.*)  
*div. Enarthrosis.*

*Motion.*—Flexion and extension, abduction and adduction, circumduction.

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## ARTICULATION OF THE KNEE.

The condyles of the femur, the head of the tibia and patella enter into this articulation.

*Femoro-tibial.*  
*cl. Diarthrosis.*  
*div. Enarthrosis.*

*External to the capsule*—an external and internal lateral, a posterior or oblique, and an anterior; the ligamentum patellæ. (*Ligamentum laterale externum longum et breve, et internum, ligamentum obliquum, ligamentum patellæ.*)  
*Within the capsule*—the alar ligaments, the ligamentum mucosum, the crucial ligaments, semilunar cartilages, transverse ligaments, and lastly, the synovial capsule. (*Ligamenta alaria, ligamentum mucosum, ligamenta cruciata genu, cartilaginee semi-lunares genu, ligamentum fibro-cartilagineum transversum et membrana synovialis*).

*Motion.*—Flexion and extension, and when the knee is bent, slight lateral motion.

## ARTICULATION OF THE TIBIA WITH THE FIBULA.

*Fibulo-tibial (superiorly).* An anterior and posterior ligament synovial capsule (*Ligamentum capituli fibulæ membrana synovialis*)  
*cl. Diarthrosis.*  
*div. Arthrodia.*  
*Fibulo-tibial (middle).* Interosseus ligament. (*Ligamentum interosseum*)  
*cl. Syneurosis.*  
*Fibulo-tibial (inferiorly).* An anterior superior, and a posterior superior ligament, fibro-cartilage synovial capsule. (*Ligamentum tibio-fibulare anterius et posterius, ligamentum fibro-cartilagineum, membrana synovialis*)  
*cl. Diarthrosis.*  
*div. Arthrodia.*

*Motion.*—No Motion.



## ARTICULATION OF THE ASTRAGALUS WITH THE TIBIA AND FIBULA.

The ankle joint is formed by the astragalus being received into a cavity formed by the lower end of the tibia and fibula.

*Tibio-tarsal.*  
*cl. Diarthrosis.*  
*div. Angular ginglymus.*

An anterior inferior, a posterior inferior, an external and an internal ligament, and the synovial capsule (*Ligamentum anterius, et posterius; ligamentum externum, vel laterale fibulæ perpendiculare; ligamentum interum laterale deltoideum, et membrana capsularis.*)

*Motion.*—Flexion and extension; lateral motion in some degree when the foot is extended.

The astragalus is connected to the calcis by two synovial capsules, one proper, the other common, (*capsula propria astragalo-calcanea, capsula communis astragalo-calcaneo-scaphoïdea.*—Mekel). These are strengthened by fibrous bands, described as three ligaments, (*ligamentum astragalo-calcaneum internum posterius, et internum anterius, ligamentum astragalo calcaneum externum.*—Mekel).

*Ligaments between the posterior row and anterior row.*

There are two capsules, one for the astragalus, the os calcis, and scaphoid (*capsula astragalo-calcaneo-scaphoïdea*—Mekel); the other for the os calcis, and cuboid (*capsula synovialis calcaneo-cuböïdea*—Mekel).

The astragalus and the os calcis are united to the scaphoid by fibrous ligaments (*ligamenta calcaneo-scaphoïdea superiora et inferiora*—Mekel).

The astragalus is connected to the scaphoid by the *ligamentum astragalo scaphoïdeum.*—Mekel.

The os calcis is united to the cuboid by superior, external, and inferior ligaments. (*Ligamenta calcaneo-cuböïdea superiora, externa, et inferiora.*)

The scaphoid is connected to the cuboid by *ligamentum inter-osseum scaphoïdo-cuböïdeum, ligamentum scaphoïdeo-cuböïdeum dorsale et plantare.*—Mekel.

The ligaments which unite the scaphoid to the three cuneiform bones are synovial capsules, and dorsal, plantar and internal ligaments.

The ligaments between the cuboid and three cuneiform bones, are synovial capsules, a dorsal, and plantar ligament.

The cuneiform bones are connected together by synovial capsules, dorsal, plantar, and inter-osseous ligaments.

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## ARTICULATION OF THE TARSUS WITH THE METATARSAS.

The three first bones of the tarsus are articulated with the three cuneiform bones, and the two last, or outer ones with the cuboid. The articulation comes under the class diarthrosis, sub-division arthrodia. Their articular surfaces are invested with cartilage, lined by the synovial membrane, and strengthened by dorsal and plantar ligaments. The metatarsal bones are connected together by transverse and inter-osseous ligaments.

The metatarsal bones are united to the first phalanges by arthrodia; the ligaments are synovial capsules, strengthened by anterior, posterior, and lateral fibrous fasciculi.

The phalanges themselves present articulations analogous to those of the finger. They are articulated with each other by that joining termed ginglymus. Their ligaments consist of synovial capsules, anterior and posterior ligaments, internal and external lateral ligaments.

## MYOLOGY.

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THE Muscles are composed of soft, flexible, parallel fibres, more or less red, possessing the property of shortening or contracting; they are the active agents of locomotion, and are also subservient to other various and important offices in the animal economy. Every muscle is divided into three parts—the body or belly, the head, and tail. The extremity which is connected to the most fixed point, is termed the head or origin; and the other extremity, fixed to the more moveable point, is termed the tail, or insertion. The fibres of which muscles are composed, in their direction are longitudinal, transverse, oblique, or semicircular, and from this circumstance they take their names; they also acquire various names from their use, size, situation, and discoverer. We shall adopt the nomenclature in common use, and also, that of M. Chaussier and M. Dumas. There have been two methods of classing muscles, the physiological and topical arrangements; by adopting the latter plan, and afterwards arranging them in classes according to their several uses, it appears to me, you will better recall to mind the most important points connected with the muscular system.

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*There is one Muscle proper to the Cranium.*

### OCCIPITO-FRONTALIS.

*Arises*      From the transverse ridge of the os occipitis

from the posterior part of the mastoid process of the temporal bone, the fibres terminate in a central aponeurosis which is expanded over the superior and lateral parts of the cranium.

*Inserted* By fleshy fibres into the integuments of the forehead.

*Situation.* *Anteriorly* it is covered by the integuments, by branches from the temporal, posterior, aural and occipital vessels, by branches from the fifth, seventh, and occipital nerves; *inferiorly* it lies upon the occipital, parietal and frontal bones.

*Use.* To raise the eye-brows, and the integuments of the forehead.

*Muscles situated around the Ear are three in number :*

### ATTOLENS AUREM OR SUPERIOR AURIS.

(*Temporo-auricularis*. Chauss. *Temporo-conchinien*.  
Dumas.)

*Arises* From the temporal aponeurosis

*Inserted* Into the fibro-cartilage of the ear, superiorly.

*Situation* *Anteriorly* it is covered by the integuments,  
*posteriorly* it lies upon the fascia temporalis.

*Use* To raise the ear.

### ATTRAHENS AUREM OR ANTERIOR AURIS.

(*Zygomatico-auricularis*. Chauss. *Zygomato-conchinien*.  
Dumas.)

*Arises* From the base of the zygomatic process of the temporal and malar bones.

*Inserted* Into the anterior part of the helix.

*Situation.* *Anteriorly* it is covered by the integuments,  
*posteriorly* it lies upon the temporal fascia and temporal artery.

*Use.* To draw the ear forwards.

## RETRAHENS AUREM OR POSTERIORAURIS.

(*Mastöido-auricularis*. Chauss. *Mastoido-conchinien*. Dumas.)

- Arises* From the posterior part of the mastoid process of the temporal bone  
*Inserted* Into the posterior part of the fibro-cartilage.  
*Situation.* *Anteriorly* it is covered by the integuments, *posteriorly* it covers the mastoid process of the temporal bone and small branches of the occipital artery.  
*Use.* To draw the ear downwards and backwards.

*There are five small muscles belonging to the cartilages of the ear.*

Tragicus	Helicus major
Antitragicus	Helicus minor
	Transversus auriculæ

*The muscles of the internal ear are four in number.*

Mallei externus	Tensor tympani
Laxator tympani	Stapedius

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*Muscles situated at the base of the orbit.*

## ORBICULARIS PALPEBRARUM.

(*Naso-palpebralis*. Chauss. *Maxillo-palpebral*. Dumas.)

- Arises* From the orbital process of the superior maxillary bone, the fibres pass outwards, are spread over the lower eye-lid and descend someway upon the cheek, are loosely connected to the external angular process of the temporal bone, they then bend inwards, covering the upper eye-lid and eye-brow.  
*Inserted* By a rounded tendon into the nasal process of the superior maxillary bone.

*Situation.* *Anteriorly* it is covered by cellular tissue remarkably devoid of fat; *posteriorly* it lies upon the orbital process of the superior maxillary bone, upon the malar bone, temporal, and nasal process of the superior maxillary bone; upon levator labii superioris alæque nasi, zygomaticus major and minor; upon the masseter, externally; *above*, upon the occipito-frontalis and pyramidalis nasi; *internally*, its tendon covers the superior half of the lacrymal sac; it lies upon the frontal vessels and nerves, upon the infra-orbital vessels and nerves; upon branches from the external maxillary artery.

*Use.* To close the eye-lids, to diffuse the tears over the globe of the eye and to determine them towards the inner canthus.

### CORRUGATOR SUPERCILII.

(*Fronto-superciliaris*. Chauss. *Cutanes-sourcilier*. Dumas.)

*Arises* From the internal angular process of the frontal bone.

*Inserted* Into the middle of the eye-brow.

*Situation.* *Anteriorly* it is covered by the orbicularis palpebrarum and pyramidalis nasi; *posteriorly*, it lies upon the superciliary ridge and supra orbital nerve and vessels.

*Use.* To approximate the eye-brows.

### *Muscles of the Nose.*

#### PYRAMIDALIS NASI.

(*Fronto-nasalis*. Chaussier and Dumas.)

*Arises* From the occipito-frontalis, passes downwards over the dorsum of the nose and joins triangularis nasi.

*Use.* To raise the integuments of the nose.

### TRIANGULARIS NASI.

(*Maxillo-nasalis*. Chauss. *Maxillo-narinal*. Dumas.)

*Arises* From the nasal process of the superior maxillary bone, and from the alveoli of the canine teeth.

*Inserted* Into the cartilage and dorsum of the nose, and by a thin aponeurosis it is connected with its fellow and the pyramidalis nasi.

*Use.* It is said to compress the alæ of the nose, but rather to dilate the nostrils.

### LEVATOR LABII SUPERIORIS ALÆQUE NASI.

(*Super-maxillo-labialis major*. Chauss. *Maxillo-labii nasal*. Dumas.)

*Arises* From the nasal process of the superior maxillary bone, and from the orbital process of the same bone above the infra orbital foramen.

*Inserted* Into the alæ of the nose and upper lip.

*Situation.* It is partly covered by the orbicularis palpebrarum; between the two origins, the angular vein, and artery pass; it lies upon the nasal process of the superior maxillary bone, the cartilage of the nose; upon the levator anguli oris, triangularis nasi, depressor labii superioris; upon the infra orbital vessels and nerve.

*Use.* To raise the upper lip, to expand the nostrils.

### DEPRESSOR LABII SUPERIORIS ALÆQUE NASI.

(*Maxillo-alveoli-nasal*. Dumas.)

*Arises* From the alveoli of the canine teeth.

*Inserted* Into into the upper lip and alæ of the nose.

*Use.* To depress the lip, and nasal cartilage

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*Muscles situated within the Orbit.*

**LEVATOR PALPEBRÆ SUPERIORIS.**

(*Orbito-palpebralis*. Chauss. *Orbito-sus-palpebral*.)

*Arises* From the bottom of the orbit and edge of the foramen opticum.

*Inserted* Into the tarsus of the superior palpebra

*Situation.* *Superiorly* it is in contact with the roof of the orbit and frontal branch of the ophthalmic nerve; *inferiorly* it lies upon the rectus superior and conjunctiva oculi

*Use.* To raise the upper eyelid.

**RECTUS SUPERIOR, OR, LEVATOR OCULI.**

(*Sus-optico-spheni-sclèroticien*. Dumas.)

*Situation.* *Superiorly* it is covered by the levator palpebræ; *inferiorly* it lies upon the tendon of the superior oblique muscle, the ophthalmic artery, the nasal and optic nerves.

**RECTUS INFERIOR, OR, DEPRESSOR OCULI.**

(*Sous optico-spheno-sclèroticien*. Dumas.)

*Situation.* *Superiorly* it covers the optic nerve, and branches from the third pair of nerves; *inferiorly* it lies upon the floor of the orbit and inferior oblique muscle;

**RECTUS-EXTERNUS, OR, ABDUCTOR OCULI.**

*Situation.* Its *external surface* is in contact with the external wall of the orbit and lachrymal gland; its *internal surface* is in opposition



with the sixth nerve, and lenticular ganglion, with the optic nerve, and with the inferior oblique muscle.

## RECTUS INTERNUS, OR, ADDUCTOR OCULI.

(*Orbito-intus-sclèroticien. Dumas.*)

*Situation.* Its *external surface* is in opposition with the internal wall of the orbit, with the obliquus superior, the lachrymal sac and *caruncula lacrymalis*; the *internal surface* lies in contact with the optic nerve.

The four muscles mentioned arise by small tendons from the edge of the foramen opticum, and are inserted by a tendinous aponeurosis into the sclerotic coat of the eye beneath the conjunctiva.

Their *use* is manifest from their description

## OBLIQUUS SUPERIOR.

(*Optico-trochlei-sclèroticien. Dumas.*)

*Arises* From the optic foramen, between the rectus superior and internus; the muscle terminates in a slender tendon, which passes through the pulley formed by the *spina trochlearis* of the frontal bone.

*Inserted* Into the sclerotic, between the rectus externus and superior

*Use.* To draw the eye forwards and inwards.

## OBLIQUUS INFERIOR.

(*Maxillo-sclèroticien. Dumas.*)

*Arises* From the orbitar and nasal process of the the superior maxillary bone: the fibres pass outwards external to the inferior rectus.

*Inserted* Into the sclerotic coat, between the rectus inferior and externus.

*Situation.* *Inferior surface* lies upon the floor of the

orbit ; *the superior* is in apposition with the rectus inferior.

*Use.* To draw the eye downwards and inwards.

### *Muscles of the Lips.*

#### LEVATOR ANGULI ORIS.

(*Super-maxillo-labialis-minor.* Chaussier.)  
(*Orbito-maxilla-labial.* Dumas.)

*Arises* From the superior maxillary bone below the infra orbital foramen.

*Inserted* Into the upper lip and angle of the mouth.

*Situation.* *Anteriorly* it is covered by the orbicularis palpebrarum, levator labii superioris and by the angular vein ; *posteriorly* it covers the infra-orbital nerves and vessels.

*Use.* To raise the upper lip and angle of the mouth.

#### ZYGOMATICUS MAJOR.

(*Zygomato-labialis major.* Chaussier.)  
(*Grand-zygomato-labial.* Dumas.)

*Arises* From the zygomatic process of the temporal and malar bones.

*Inserted* Into the angle of the mouth.

*Situation.* *Anteriorly* it is covered by the orbicularis palpebrarum and integuments ; *posteriorly* it lies upon the masseter and buccinator.

*Use.* To raise the angles of the mouth.

#### ZYGOMATICUS MINOR.

(*Zygomatiko-labialis minor.* Chaussier.)  
(*Petit zygomatiko-labial.* Dumas.)

*Arises* When present, from the most prominent point of the os malæ

*Inserted* Into the upper lip nearer to the nose.

**Situation.** *Anteriorly* it is covered by the integuments and orbicularis palpebrarum; *posteriorly*, it lies upon the angular vein and levator anguli oris.

**Use.** To raise the upper lip.

### LEVATOR LABII INFERIORIS.

(*Petit sub-maxillo-labial. Dumas.*)

**Arises** From the alveoli of the lower incisor teeth

**Inserted** Into the integuments of the chin and mucous membrane of the lower lip.

**Situation.** It is covered by the mucous membrane of the mouth.

**Use.** To raise the upper lip.

### DEPRESSOR ANGULI ORIS, OR TRIANGULARIS.

(*Maxillo-labialis inferior. Chauss. Sous-maxillio-labial. Dumas.*)

**Arises** From the margin of the lower maxilla.

**Inserted** Into the angle of the mouth.

**Situation.** It is covered by the integuments and platysma myoides; it lies upon the quadratus genæ, and upon a portion of the buccinator.

**Use.** To depress the angle of the mouth.

### DEPRESSOR LABII INFERIORIS, OR QUADRATUS GENÆ.

(*Mento-labialis. Chauss. Mentonnier labial. Dumas.*)

**Arises** From the chin.

**Inserted** Into the under lip.

**Situation.** It is covered by the integuments, and triangularis oris; it lies upon the inferior maxillary vessels and nerves and orbicularis oris, and also upon the levator menti.

**Use.** To depress the lower lip.

## LEVATOR MENTI.

(Sous maxilo-cutané. Dumas.)

- Arises* From the fossa at the root of the alveoli of the lower incisor teeth ; the fibres descend.
- Inserted* Into the integuments of the chin.
- Situation.* It is covered by the quadratus genæ.
- Use.* To raise the chin and the under lip a little upwards.

## BUCCINATOR.

(Bucco-labialis. Chauss. Alveolo maxillaire. Dumas.)

- Arises* From the alveolar processes of the upper and lower jaw, close to the two last molar teeth, and from the pterygoid processes of the sphenoid bone.
- Inserted* Into the angle of the mouth.
- Situation.* *The external surface* is covered by the masseter, by the parotid duct, zygomaticus major, triangularis oris, external maxillary vessels, and platysma myöides ; *internally* it is lined by the mucous membrane of the mouth.
- Use.* To draw the angles of the mouth backwards, and to compress the cheeks.

## ORBICULARIS ORIS.

(Labialis. Chauss. &amp; Dumas.)

This muscle may be described as a semicircular band of muscular fibres, surrounding the superior and inferior lips, interlacing each other at the angles, and connected with the neighbouring muscles.

- Situation.* *The anterior surface* is covered by the levators of the upper lip ; *the posterior surface* is lined by the mucous membrane of the mouth, and covers the labial glands and coronary vessels.

**Use.** To contract the mouth, and corrugate the lips.

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*Of the Muscles which surround the Temporo-maxillary Articulation.*

**TEMPORALIS.**

(*Temporo-maxillaris.* Chauss.  
*Arcadi-temporo-maxillaire.* Dumas.)

- Arises** From the temporal ridge, temporal fossa, and temporal fascia.
- Inserted** Into the coronoid process of the lower maxilla
- Situation.** It is covered by fascia, muscles of the ear, orbicularis palpebrarum, temporal vessels and nerves, by the zygomatic arch and the masseter; *internally* it lies upon the temporal fossa, deep temporal vessels, and buccinator.
- Use.** Powerfully to raise the lower jaw; and will also draw it backwards and forwards.

**MASSETER.**

(*Zygomato-maxillaris.* Chauss & Dumas).

- Arises** From the zygoma, from the inferior part of os maxilæ.
- Inserted** Into the external surface of the angle of the lower jaw.
- Situation.** It is covered *behind* by the parotid gland; *above*, by the orbicularis palpebrarum; *below* by the platysma myoides: it is crossed by branches from the seventh pair of nerves, by the transverse artery of the face, and by the parotid duct: *the internal surface* lies upon the ascending plate of the lower maxilla, and *anteriorly* upon the buccinator.

- Use.* It concurs to raise the lower jaw, and will also advance it backwards or forwards.

### PTERYGÖIDEUS EXTERNUS.

(*Pterygo-maxillaris superior.* Chauss.)  
(*Pterygo colli maxillaire.* Dumas.)

- Arises* From the external pterygoid plate of the sphenoid bone, from the tuberosity of the superior maxilla.
- Inserted* Into the neck of the lower jaw, capsular ligament, and margin of the inter-articular cartilage.
- Situation.* *Externally* it adheres to the temporal muscle by a common aponeurosis; *internally* it lies in contact with the pterygöideus internus, the inferior maxillary nerve, internal lateral ligament, and middle meningeal vessels.
- Use.* To raise the lower jaw, and draw it to one side.

### PTERYGÖIDEUS INTERNUS.

(*Pterygo-maxillaris inferior.* Chauss.)  
(*Pterygo-anguli-maxillaire.* Dumas.)

- Arises* From the internal pterygoid plate of the sphenoid bone, and from the pterygoid fossa.
- Inserted* Into the inner border of the angle of the jaw, opposite the insertion of the masseter.
- Situation.* *Externally* it is separated from the pterygöideus externus by cellular tissue, afterwards from the ascending plate of the lower jaw by the inferior maxillary vessels, nerves, and their branches: *internally* it lies against the constrictor pharyngeus superior, and sub-maxillary gland.
- Use.* It gives lateral motion to the jaw, and when thrown into action with its fellow, the the jaw will be raised.

*Of the Muscles situated at the anterior part of the Neck.*

The following muscles belong to this region:—the platysma myöides, sterno-cléido-mastöideus, sterno-hyöideus, sterno-thyröideus, omo-hyöideus, crico-thyröideus, thyro-hyöideus, digastricus, mylo-hyöideus, genio-hyöideus, genio-hyo-glossus, lingualis; the muscles of the larynx, those of the pharynx and fauces; the deep muscles of the neck, namely, the rectus capitis anticus major and minor, and the longus colli.

On removing the skin and cellular substance of the fore part of the neck, a thin tendonous fascia presents itself, which is a continuation of the same fascia which covers the muscles of the abdomen and chest, the superficial fascia of the neck. This fascia ascends upon the face, is connected with the zygoma, the mastoid process of the temporal bone and base of the lower jaw. From the posterior surface of this fascia, the deep cervical fascia is derived: this consists of two layers: one passes in front of the sterno-cléido-mastöideus muscle, the other posterior. This posterior layer presents some important connections. *At the lower part* it is strong, and adheres to the inter-articular ligament and sternum: *externally* it adheres to the sheath of the cervical vessels; *internally* it is prolonged in front of the trachea, and sends sheaths around the sterno-hyöideus and sterno-thyröideus muscles; *superiorly*, it sinks behind the angle of the jaw to which it adheres; also, to the styloid process of the temporal bone and to the stylo-maxillary ligament. This fascia binds down the muscles of the neck and supports the vessels and glands in this region; *inferiorly*, it may be said to complete the upper boundary of the thorax, and to bear off the pressure of the atmosphere from the trachea in inspiration.

## PLATYSMA MYÖIDES.

(*Thoraco-facialis*. Chaussier.)  
(*Thoraco-maxilli-facial*. Dumas.)

The Platysma Myöides is a musculo membranous layer, situated immediately beneath the integuments

covering the upper part of the chest, the neck, and lower part of the face.

**Arises.** *Inferiorly* it is connected to the fascia covering the pectoralis major and deltoid.

**Inserted** Into the base of the lower jaw, the angle of the mouth and fascia, covering the parotid gland.

**Situation.** It is covered by the integuments, and superiorly, by the triangular oris: *it lies upon* the lower jaw and the clavicle; upon the buccinator, masseter, digastricus, mylohyoideus, sterno-cléido-mastôideus, omohyoideus, sterno-hyoideus, sterno-thyroideus, pectoralis major, deltoid, and trapezius muscles; upon the external maxillary, lingual, and superior thyroideal and axillary vessels; upon the carotid sheath and its contents; upon the external jugular vein; upon branches from the fifth and seventh pair of nerves, superficial branches of the cervical plexus, upon the axillary plexus; lastly, upon the parotid, submaxillary and lymphatic glands.

**Use.** To depress the mouth and the lower jaw, to corrugate the integuments of the neck.

### STERNO-CLEIDO-MASTÔIDEUS.

**Arises** From the superior border of the sternum, and sternal end of the clavicle.

**Inserted** Into the mastoid process of the temporal bone, and adjoining portions of the os occipitis.

**Situation.** *Anteriorly* it is covered by the platysma myoides, by the external jugular vein, and filaments of the first cervical plexus of nerves: *posteriorly* it lies upon the superior border of the sternum, the sternal, third of the clavicle, the sterno-clavicular articulation, and the mastoid process of the temporal bone: upon the digastricus, splenius, levator anguli scapulæ, the omo-



hyoïdeus, scalenus, anticus, sterno hyoïdeus, sterno thyroïdeus; upon the carotid sheath and its contents; upon the deep branch of the first cervical plexus and spinal accessory nerves. The posterior margin, with the clavicle, trapezius, and omo-hyoïdeus forms a triangular space, in which the subclavian vessels and axillary plexus of nerves are lodged.

*Use.* To turn the head to one side, and bend the head forwards.

### STERNO HYÖIDEUS.

*Arises* From the inner surface of the superior border of the sternum, from the sternal end of the clavicle from the first rib.

*Inserted* Into the inferior border of the os hyoides.

*Situation.* *Anteriorly* it is covered by the sternum, the clavicle, platysma myoïdes, sterno-clavicular articulation, and sterno-cléïdo mastoïdeus: *posteriorly* it lies upon the thyrohyoïdeus, sterno-thyroïdeus, and thyrohyoïd ligament; upon the superior thyroïdeal vessels, and carotid sheath; upon the thyroid gland.

*Use.* To draw down the os hyoides, consequently to depress the larynx and pharynx.

### STERNO-THYRÖIDEUS.

*Arises* From the superior and internal margin of the sternum, and from the first rib.

*Inserted* Into the rough line on the ala of the thyroid cartilage.

*Situation.* It is covered by the sternum, platysma-myoïdes, sterno-hyoïdeus, sterno-cléïdo-mastoïdeus, omo-hyoïdeus: it lies upon the crico thyroideus: upon the carotid sheath, superior and inferior thyroïdeal vessels, the vena innominata: upon filaments from the descendens noni: upon the trachea and thyroid gland.

*Use.* To draw the larynx downwards.

### THYRO-HYÖIDEUS.

*Arises* From the ala of the thyroid cartilage  
*Inserted* Into the cornu of the os hyöides.  
*Situation.* It is covered by the platysma myöides, sterno-hyöideus, omo-hyöideus: it lies upon the thyro-hyoid ligament, upon the thyroid cartilage, and branch from the superior thyroideal artery.  
*Use.* To draw the os hyöides downwards, or the thyroid cartilage upwards.

### CRICO THYRÖIDEUS.

*Arises* From the cricoid cartilage.  
*Inserted* Into the ala of the thyroid and inferior cornu.  
*Situation.* *Anteriorly* it is covered by the sterno-hyöideus and sterno thyroideus; *posteriorly* it lies upon the thyroid and cricoid cartilages, upon a small artery, and crico-thyroid ligament.  
*Use.* To depress the thyroid and elevate the cricoid cartilage.

### OMO-HYÖIDEUS.

(*Coraco-hyoidien.* Dumas.)

*Arises* From the superior costa of the scapula and transverse ligament.  
*Inserted* Into the os hyöides at the junction of its body with its cornua.  
*Situation.* *Anteriorly* it is covered by the clavicle, platysma myöides, the trapezius, and sterno-cléido-mastöideus; *posteriorly* it lies upon the scalenii, sterno-hyöideus, sterno-thyroideus, the carotid sheath, and superior thyroideal vessels, upon the cervical plexus, phrenic, and great sympathetic nerves.

*Use.* To draw downwards the os hyoides, and somewhat laterally.\*

## DIGASTRICUS.

(*Genio-mastöideus*. Chauss.)  
(*Mastöido-hygenicus*. Dumas.)

*Arises* From the fossa digastrica

*Inserted* Into a rough depression on the side of the internal spine of the lower maxilla.

*Situation.* It is covered by the mastoid process of the temporal bone; by a portion of the sterno-cleido-mastöideus, splenius, complexus, stylo-hyoideus, by a portion of the parotid and submaxillary glands: it lies upon the stylo-hyöideus, pharyngeus et glossus, upon the mylo-hyöideus, upon the external and internal carotids, external maxillary and lingual vessels; upon the internal jugular vein; upon the great sympathetic, eighth and ninth pair or sublingual nerves.

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\* *Angles of the Neck.*—We have first a large triangular space, situated on the fore part of the neck; the base is formed by the lower jaw; the apex by the sternum; the sides by the sterno cleido mastöidei. This is divided into two lateral portions by the mesial line. We have a second triangular space between the sterno cleido mastöideus, trapezius and clavicle. Both these triangular spaces are subdivided by the omo-hyoideus. These spaces can be ascertained during life; and from the parts contained therein, an accurate knowledge is of the greatest importance.

The first subdivision of the anterior lateral triangle, may be called *Omo-hyoidien*:—the base is formed by the os hyoides; the outer border by the sterno-cleido mastöideus; the inner and inferior border by the omo-hyoideus: it contains the common carotid artery and its two branches, the superior thyroideal, lingual, and facial arteries; the internal jugular vein; the eight pair, superior laryngeal, and great sympathetic nerves; the thyro-hyoideus; a portion of the middle and inferior constrictor muscles of the pharynx.

Second division—*Omo Trachelien*:—bounded above and on the outer side by the omo-hyoideus and sterno-cleido-mastöideus; on the inner side and below by the trachea: it contains the common carotid, inferior thyroideal and vertebral arteries; the internal jugular vein; the eight pair of nerves; recurrent laryngeal and great sympathetic nerves; sterno-hyoideus, and sterno-thyroides muscles; the trachea and œsophagus.

Subdivisions of the second—*The inferior Omo-clavicular* is bounded below by the clavicle; above and to the outer side by the omo-hyoideus; on the inner side by the sterno-cleido-mastöideus: it contains subclavian, vertebral, inferior thyroideal, supra scapular, ascending and posterior cervical arteries; jugular veins; phrenic and origin of the last cervical nerves.

*Omo-trapezien* is bounded below by the omo hyoideus; outer side by the trapezius; inner side by the sterno cleido-mastöideus: it contains the transverse cervical artery; the origin of the fourth and fifth pair of cervical nerves; the splenius capitis et colli, levator anguli scapulæ and the scalenus posticus muscles.

*Use.* To raise the os hyöides, to depress the lower jaw.

### STYLO-HYÖIDEUS.

*Arises* From the styloid process of the temporal bone

*Inserted* Into the cornu of the os hyöides.

*Situation.* *Externally*, it is covered by the digastricus and parotid gland; *posteriorly*, it lies upon the stylo-pharyngeus, stylo-glossus et hyo-glossus, upon the external carotid, lingual, and external maxillary arteries, upon the internal jugular vein, upon the ninth pair of nerves.

### MYLO-HYÖIDEUS.

*Arises* From the inner surface of the lower maxilla, between the last dens molaris and the symphysis.

*Inserted* Into the lower edge of the basis of the os hyöides.

*Situation.* It is covered by the digastricus, platysma myöides and submaxillary gland. *posteriorly*, it lies upon the genio-hyöideus, genio-hyo-glossus and hyo-glossus; upon the lingual branches of the inferior maxillary nerve; upon the sublingual gland, and submaxillary duct.

*Use.* To depress the lower jaw and raise the os hyöides.

### GENIO-HYÖIDEUS

*Arises* From the internal spine of the symphysis of the lower maxilla.

*Inserted* Into the basis of the os hyöides.

*Situation.* It is covered by the mylo-hyöideus; *posteriorly*, it lies upon the genio-hyo-glossus and hyo-glossus.

*Use.* To raise the os hyöides, to depress the lower jaw.

*Of the Muscles of the Tongue.***GENIO-HYO-GLOSSUS.**

- Arises* From the oblique ridge on the inner surface of the lower maxilla.
- Inserted* Into the whole length of the tongue from the base to the apex.
- Situation.* *Externally*, it is covered by the hyo-glossus, stylo-glossus, and lingualis; by the sublingual gland; *superiorly*, by the mucous membrane of the mouth.
- Use.* To draw the tongue backwards; to draw its root forwards; to render the dorsum concave.

**HYO-GLOSSUS.***(Hio-chondro-glosse. Dumas.)*

- Arises* From the body and cornu of the os hyoides.
- Inserted* Into the side of the tongue.
- Situation.* *Anteriorly*, it is covered by the digastricus, mylo-hyöideus, genio-hyöideus, stylo-hyöideus, stylo-glossus, by the ninth pair of nerves, by the sublingual gland, by the submaxillary duct: *its internal* surface lies upon the constrictor pharyngis medius, the genio-hyo glossus, lingualis, upon the gustatory nerve and lingual artery.
- Use.* To pull the tongue downwards and inwards.

**STYLO-GLOSSUS.**

- Arises* From the styloid process of the temporal bone.
- Inserted* Into the side of the tongue.
- Situation.* *Anteriorly*, it is covered by the digastricus, the submaxillary gland, the gustatory nerve, and mucous membrane of the mouth; *posteriorly*, it lies upon the genio-hyo-glossus, lingualis, and constrictor pharyngis superior.

*Use.* To draw the tongue to one side, to draw it upwards and backwards.

### LINGUALIS.

*Arises* From the base of the tongue.

*Inserted* Into the apex.

*Situation.* It is placed between the genio-hyo-glossus *internally*, and the hyo, and stylo glossus *externally*; *below* it is contact with the mucous membrane of the mouth.

### *Of the Muscles of the Pharynx*

#### CONSTRUCTOR INFERIOR PHARYNGIS.

(*Crio-thyro-pharyngien. Dumas.*)

*Arises* From the cricoid cartilage, from the inferior corner of the thyroid cartilage.

*Inserted* Into the middle back and part of the pharynx.

*Situation.* The external surface, *posteriorly*, lies upon the longus colli, the rectus capitis anticus major; *anteriorly*, upon the thyroid gland, common carotid artery, and sterno-thyroideus muscle; *internally*, it lies upon the constrictor medius, stylo, and palato-pharyngeus, upon the mucous membrane of the pharynx, upon the cricoid and thyroid cartilages. The inferior laryngeal nerve passes beneath its lower edge, the superior laryngeal beneath its upper.

#### CONSTRUCTOR PHARYNGIS MEDIUS.

*Arises* From the superior cornu of the thyroid cartilage, from the thyro-hyoid ligament, and cornu of the os hyoides.

*Inserted* Into the middle and back part of the pharynx, into the cuneiform process of the os occipitis.

**Situation.** *Externally*, it lies upon the constrictor inferior, the longus colli rectus capitis anticus major; *anteriorly*, it corresponds with the hyo-glossus; *internally*, it is covered by the mucous membrane of the pharynx, by the superior constrictor: the *inferior* border is separated from the constrictor inferior by the superior laryngeal nerve; the *superior* border is separated from the superior constrictor by the stylo pharyngeus and glossopharyngeal nerve.

## CONSTRICtor PHARYNGIS SUPERIOR.

(*Pterygo-syndesmo-staphili-pharyngien.* Dumas.)

**Arises** From the cuneiform process of the os occipitis, from the pterygoid process of the sphenoid bone, from the upper and lower jaw near the roots of the last dentes molares, from the root of the tongue, and from the palate.

**Inserted** Into the middle and back part of the pharynx.

**Situation.** *Externally*, it lies upon the middle constrictor, the stylo pharyngeus and stylo glossus, upon the internal carotid artery and internal jugular vein; *internally*, it is covered by the mucous membrane of the mouth; *superiorly*, beneath the basilar process a small portion on either side of the mucous membrane is uncovered by the fibres of this muscle, forming a little pouch (*the sinus of Morgagni*): it is bounded by the openings of the nares, eustachian tubes, and the glottis.

**Use.** The three constrictors contract the bag of the pharynx, and force the alimentary mass into the æsophagus.

## STYLO-PHARYNGEUS.

**Arises.** From the styloid process of the temporal bone

**Inserted** Into the sides of the pharynx.

- Situation.** It is covered by the stylo-hyoidæus, constrictor medius, and external carotid artery; *internally* it lies upon the internal carotid artery and internal jugular vein, is separated from the middle constrictor by the glosso-pharyngeal nerve; upon the mucous membrane of the pharynx, and palato-pharyngeus muscle.
- Use.** To raise the pharynx and dilate the pharynx transversely.
- 

### *Muscles of the soft Palate.*

#### PALATO-PHARYNGEUS.

(*Pharyngo-staphylin.* Dumas.)

- Arises** From the middle of the velum pendulum palati.
- Inserted** Into the sides and back part of the pharynx.
- Situation.** It is situated within the folds of the mucous membrane, constituting the posterior pillar of the fauces.
- Use.** To raise the pharynx, to draw down the velum to prevent the food passing into the nares.

#### CONSTRUCTOR ISTHMI FAUCIUM.

(*Glosso-staphylinus.* Chauss. *Glosso-staphylin.* Dumas.)

- Arises** From the middle of the velum, pendulum palati, and roof of the uvula.
- Inserted** Into the side of the tongue.
- Situation.** It is situated within the folds of the mucous membrane, constituting the anterior pillar of the fauces.
- Use.** To draw down the velum, to raise the base of the tongue, to close the opening between the mouth and fauces.



## CIRCUMFLEXUS, VEL TENSOR PALATI

(*Pterygo-staphylinus*. Chauss.)  
(*Spheno-salpingo-staphylin*. Dumas.)

**Arises** From the root of the internal pterygoid plate of the sphenoid bone and spinous process, from the edge of the cartilaginous extremity of the eustachian tube.

**Inserted** Into the velum pendulum palati.

**Situation.** It descends between the pterygoidemus internus and internal pterygoid plate.

**Use.** To stretch the velum, to draw it downwards and forwards, to open the eustachian tube.

## LEVATOR PALATI MOLLIS

(*Petro-staphylinus*. Chauss.)  
(*Petro-salpingo-staphylin*. Dumas.)

**Arises** From the petrous portion of the temporal bone, and from the eustachian tube.

**Inserted** Into the velum.

**Situation.** Its outer surface corresponds with the tensor palati; its inner surface with the mucous membrane of the pharynx: its superior border is placed in front of the carotid canal, behind the eustachian tube.

**Use.** To raise the velum upwards and backwards, to prevent the food passing into the nares and eustachian tube.

## AZYGOS UVULÆ.

(*Palato-staphylinus*. Chauss. & Dumas.)

**Arises** From the transverse suture of the palate bone.

**Inserted** Into the tip of the uvula.

**Situation.** It is covered by the mucous membrane of the mouth.

**Use.** To raise the uvula upwards and forwards.

*Of the Muscles of the Larynx.*

The sterno-thyröideus, crico-thyröideus, sterno-hyöideus, and thyro-hyöideus have already been described.

**CRICO-ARYTENÖIDEUS POSTICUS.**

- Arises* From the back part of the cricoid cartilage.  
*Inserted* Into the posterior part of the base of the arytenoid cartilage.  
*Situation.* *Its posterior surface* is covered by the pharynx; *the anterior surface* lies upon the cricoid and arytenoid cartilages and capsular ligament.  
*Use.* To draw back the arytenoid cartilage, to tighten the vocal ligaments.

**CRICO ARYTÆNOIDEUS LATERALIS.**

(*Crico-lateri-arithenöidien.* Dumas.)

- Arises* From the side of the cricoid cartilage.  
*Inserted* Into the side of the base of the arytenoid cartilage.  
*Situation.* *Externally* it is covered by the thyroid cartilage; *internally* it corresponds with the cavity of the larynx.  
*Use.* To open the rima glottis, by separating the vocal ligaments.

**THYRO-ARYTÆNÖIDEUS.**

- Arises* From the back part of the pomum adami.  
*Inserted* Into the anterior surface of the arytenoid cartilage.  
*Situation.* *Externally* it lies upon the thyroid cartilage; *internally* it is covered by the mucous membrane.  
*Use* To draw the arytenoid cartilage forwards, to relax the vocal ligaments.

### ARYTÆNÖIDEUS OBLIQUUS.

- Arises* From the base of one arytenoid cartilage.  
*Inserted* Into the tip of the other arytenoid cartilage.  
*Situation.* *Posteriorly* it is covered by the pharynx; *anteriorly* it lies upon the arytenöideus transversus and arytenoid cartilages.  
*Use.* To approximate the cartilages, to close the opening of the glottis.

### ARYTÆNOIDEUS TRANSVERSUS.

- Arises* From the base of one cartilage.  
*Inserted* Into the cartilage on the opposite side.  
*Use.* To assist in closing the glottis.
- 

*Within the mucous membrane connecting the arytenoid cartilages to the epiglottis, and the epiglottis to the thyroïd cartilage, we have a few pale fibres—viz. :—*

### ARYTENO-EPIGLOTTIDEUS.

- Arises* From the side of one arytenoid cartilage.  
*Inserted* Into the epiglottis.  
*Use.* To draw down the epiglottis to close the glottis.

### THYRO-EPIGLOTTIDEUS.

- Arises* From the thyroid cartilage.  
*Inserted* Into the epiglottis laterally.  
*Use.* To draw the epiglottis downwards, and also, when both act, to expand that cartilage.

*Muscles situated deeply on the anterior part of the neck.*

### LONGUS COLLI.

(*Prædorso-atlloideus.* Chauss.)  
(*Predorso-cervical.* Dumas.)

- Arises** From the bodies of the three superior dorsal vertebræ from the transverse processes of the third, fourth, fifth and sixth cervical vertebræ.
- Inserted** Into the bodies of all the cervical vertebræ.
- Situation.** *Anteriorly* it is covered by the rectus capitis anticus major; by the pharynx and œsophagus; by the common carotid artery; by the eighth pair, and great sympathetic nerves; *posteriorly* it lies upon the ligamentum vertebrarum commune anterius.
- Use.** To bend the neck forwards and to one side.

### RECTUS-CAPITIS ANTICUS MAJOR.

(*Trachelo-sub-occipitalis.* Chauss. *Grand trachelo-basilaire.* Dumas.)

- Arises** From the transverse processes of the third, fourth, and fifth cervical vertebræ.
- Inserted** Into the cuneiform process of the os occipitis.
- Situation.** *Anteriorly*, it corresponds with the pharynx, common carotid artery, internal jugular vein, great sympathetic and eighth pair of nerves; *posteriorly* it lies upon the rectus capitis anticus minor, and longus colli.
- Use.** To bend the head forwards.

### RECTUS CAPITIS ANTICUS MINOR.

(*Trachelo sub-occipitalis minor.* Chauss.)  
(*Petit trachelo-basilaire.* Dumas.)

- Arises** From the fore part of the atlas.
- Inserted** Into the cuneiform process of the os occipitis near the root of the condyloid process.

*Situation.* *Anteriorly* it is covered by the rectus capitis anticus major, by the internal carotid artery, and eighth pair of nerves; *posteriorly* it covers the capsular ligament of the atlas.

*Use.* To nod the head forwards.

*Of the muscles on the side of the Neck.*

SCALENUS ANTICUS.

(*Trachelo-costalis.* Dumas.)

*Arises* From the transverse process of the third, fourth, fifth and sixth cervical vertebræ.

*Inserted* Into the first rib near to its cartilage.

*Situation.* *Anteriorly* it is covered by the omo-hyöideus, sterno-cleïdo-mastöideus; transverse and ascending cervical arteries, and subclavian vein, and by the phrenic nerve; *posteriorly* it lies upon the subclavian artery and cervical plexus of nerves; *internally* it is in apposition with the vertebral artery and vein.

SCALENUS MEDIUS.

*Arises* From the transverse process of all the cervical vertebræ.

*Inserted* Into the first rib, nearer to the spine.

*Situation.* *The anterior margin* corresponds with the scalenus medius, from which it is separated by some of the inferior branches of the cervical nerves; *the posterior border* corresponds with the transversalis colli, levator anguli scapulæ and splenius colli.

SCALENUS POSTICUS.

*Arises* From the transverse processes of the three inferior cervical vertebræ.

*Inserted* Into the second rib, between its tubercle and angle.

- Situation.** It is separated from the middle scalenus by two or three branches of the cervical nerves; *posteriorly and externally* are placed the transversalis and splenius colli.
- Use.** The three scaleni bend the neck forwards or to one side; when the neck is fixed, they elevate the ribs and dilate the chest, assisting in the function of inspiration.

### RECTUS CAPITIS LATERALIS.

(*Atlido-sub-occipitalis.* Chauss.)  
(*Tracheli-atlido-basilaire.* Dumas.)

- Arises** From the transverse process of the atlas.
- Inserted** Into the os occipitis, in front of the jugular process.
- Situation.** *Anteriorly* it is covered by the internal jugular vein, *posteriorly* it corresponds to the vertebral artery.
- Use.** To turn the head to one side.

### INTER-TRANSVERSALES COLLI.

(*Inter-tracheliens.* Dumas.)

- They consist of two layers, an anterior and posterior.
- Arise** From the transverse process of the first cervical.
- Inserted** Into the transverse process of the last.
- Situation.** *Anteriorly* they are covered by the rectus capitis anticus major; *posteriorly*, they lie upon the anterior branches of the cervical nerves.
- Use.** To approximate the transverse processes of the cervical vertebræ, to turn the head a little to one side.

*Muscles situated at the posterior part of the Trunk.*

On removing the integuments, you expose the Trapezius, a portion of the Latissimus dorsi, a portion of the rhomböideus major, and the fascia covering the infra spinatus.

## TRAPEZIUS.

(*Dorso-acromialis*. Chauss.)  
 (*Occipiti-dorso-sus acromien*. Dumas.)

- Arises* From the transverse ridge of the os occipitis, from the ligamentum nuchæ, from the spinous process of the last cervical, and from the spinous processes of all the dorsal vertebræ.
- In serted* Into the *external* third of the clavicle, into the acromion and the whole of the spine of the scapula.
- Situation.* *Posteriorly* it is covered by the integuments, *anteriorly* it lies upon the splenius, complexus, levator anguli scapulæ, a portion of the serratus posticus superior, supra spinatus, rhomböidei, a portion of the infra spinatus, latissimus dorsi.
- Use.* To move the shoulder upwards and backwards, downwards and backwards, or directly backwards. When the scapula is fixed, it will extend the head or move it laterally.

## LATISSIMUS DORSI.

(*Lumbo-humeralis*. Chauss.)  
 (*Dorsi-lumbo-sacro-humeral*. Dumas.)

- Arises* From the back part of the crista of the ilium, and sacrum, from the spinous processes of all the lumbar vertebræ, from the spinous processes of the seven inferior dorsal, and from the four inferior ribs.
- Inserted* Into the inner edge of the bicipital groove.
- Situation.* *Posteriorly* it is covered by the trapezius and integuments; *anteriorly* it covers the serratus posticus inferior, the obliquus internus, external intercostals, sacro-lumbalis, longissimus dorsi, rhomböideus major, infra spinatus, serratus magnus, the inferior ribs, and inferior angles of the scapula;

the axillary vessels and nerves cross its tendinous insertion.

*Use.* To carry the arm downwards and backwards; to rotate the humerus, to raise the lower ribs.

On removing the trapezius and<sup>1</sup> latissimus dorsi, we expose the rhomböideus major and minor, the levator anguli scapulæ.

## RHOMBÖIDEUS MAJOR AND MINOR.

(*Dorso-scapularis*. Chauss.)  
(*Cervici-dorso-scapulaire*. Dumas.)

*Arises* From the spinous processes of the five superior dorsal vertebræ.

*Inserted* Into the base of the scapula below its spine.

### *Rhomböideus minor.*

*Arises* From the spinous processes of the three inferior cervical vertebræ.

*Inserted* Into the base of the scapula above its spine.

*Situation.* *Posteriorly* it is covered by the trapezius and latissimus dorsi; *anteriorly* it lies upon the serratus posticus superior, the splenius colli, sacro-lumbalis, longissimus dorsi, external intercostals and five superior ribs.

*Use.* To draw the scapulæ upwards and backwards.

## LEVATOR ANGULI SCAPULÆ.

(*Trachelo-scapularis*. Chauss.)  
(*Trachelo-anguli scapulaire*. Dumas.)

*Arises* From the transverse processes of the five superior cervical vertebræ.

*Inserted* Into the superior angle, and upper part of the base.

*Situation.* *Externally* it is covered by the sterno-cléido-mastöideus and trapezius; *internally*, it lies upon the splenius colli, transversalis, serratus posticus superior.



On removing the rhomböidei and levator anguli scapulæ, the serratus posticus superior is exposed; *inferiorly* the serratus posticus inferior.

### SERRATUS POSTICUS SUPERIOR.

(*Dorso-costalis*. Chauss. *Cervici-dorso-costal*. Dumas.)

- Arises* From the spinous processes of the three last cervical vertebræ and two upper dorsal.
- Inserted* Into the second, third, fourth and fifth ribs external, to their angles.
- Situation.* It is covered *posteriorly* by the trapezius, rhomböidei, levator anguli scapulæ, serratus magnus; *anteriorly* it lies upon splenius capitis et colli, transversalis, sacro-lumbalis, longissimus dorsi, and four superior ribs.
- Use.* To raise the ribs, to dilate the thorax.

### SERRATUS POSTICUS INFERIOR.

(*Lumbo-costalis*. Chauss. *Dorsi-lumbo-costal*. Dumas).

- Arises* From the spinous processes of the two inferior dorsal, and three superior lumbar vertebræ.
- Inserted* Into the four inferior ribs near to their cartilages.
- Situation.* *Posteriorly* it is covered by the latissimus dorsi; *anteriorly*, it lies upon the sacro-lumbalis, longissimus dorsi, and four inferior ribs.
- Use.* To depress the ribs, to diminish the capacity of the chest.

On removing the serratus posticus superior and inferior, will be exposed the splenius, sacro-lumbalis, longissimus dorsi, spinalis dorsi.

## SPLENIUS CAPITIS.

(*Cervico-mastöideus.* Chauss.)(*Cervico-dorso-mastöiden.* Dumas.)

- Arises* From the spinous processes of the four upper dorsal, and five inferior cervical vertebræ.
- Inserted* Into the transverse processes of the five superior cervical vertebræ, into the transverse ridge of the os occipitis and mastoid process of the temporal bone. That portion inserted into the transverse processes is frequently called splenius colli.
- Situation.* *Posteriorly* it is covered by the sterno-cleido-mastöideus, levator anguli scapulæ, trapezius, serratus posticus superior, and rhomböideus; *anteriorly* it lies upon the complexus, transversalis, semi-spinalis colli, semi-spinalis dorsi, spinalis dorsi.
- Use.* To bend the head directly backwards or laterally.

## SACRO LUMBALIS.

(*Sacro-costalis.* Chauss.)(*Lumbo-costo-trachelien.* Dumas.)

- Arises* From the back part of the sacrum, from the back part of the crista of the ilium, from the transverse processes of all the lumbar vertebræ.
- Inserted* Into the transverse processes of all the dorsal vertebræ, and into all the ribs close to their angles.
- Situation.* *Posteriorly* it is covered by the glutæus maximus, obliquus internus, transversalis abdominis, serratus posticus inferior, latissimus dorsi, trapezius, rhomböidei, serratus posticus superior; *anteriorly* it lies upon the sacrum, the transverse processes of the lumbar vertebræ, external intercostals, and costæ.

**Use.** To extend the spine, to depress the ribs, when the trunk has been bent to bring it back to a state of extension.

## LONGISSIMUS DORSI.

(*Sacro spinalis.* Chauss.)  
(*Lombo-dorso-trachelicus.* Dumas.)

**Arises** From the back part of the sacrum, from the spinous and transverse processes of all the lumbar vertebræ.

**Inserted** Into all the ribs between their tubercles and angles, excepting the two last, and into the transverse processes of all the dorsal vertebræ.

**Situation.** Same as the preceding muscle; it is placed between the sacro-lumbalis, and spinalis dorsi.

**Use.** To assist in preserving the erect position of the trunk, to depress the ribs, and thus diminish the capacity of the chest.

On separating these two muscles, you expose five or six tendinous slips, arising from the superior edge of the six lower ribs, and ascending, are inserted into the sacro-lumbalis, these have been described as the *musculi accessorii ad sacro-lumbales*.

## SPINALIS DORSI.

**Arises** From the spinous processes of the two superior lumbar vertebræ, and the three last dorsal.

**Inserted** Into the spinous processes of the nine superior dorsal vertebræ, except the first.

**Situation** Same as the preceding muscle, it is placed between the longissimus dorsi and spinous processes of the vertebræ.

**Use.** To erect, fix, and raise the spine when bent.

On removing the splenius, sacro lumbalis, longissimus dorsi, spinalis dorsi, you bring into view complexus,

trachelo-mastöideus, cervicalis ascendens, transversalis colli.

### COMPLEXUS MAJOR.

(*Tracheto-osciptatis*. Chauss.)  
(*Dorsi brachelo-occipital*. Dumas.)

- Arises* From the transverse processes of the four superior dorsal vertebræ, from the transverse processes of the cervical vertebræ.
- Inserted* Into the transverse ridge of the os occipitis, and mastoid process of the temporal bone.
- Situation.* *Posteriorly* it is covered by the trapezius, splenius capitis et colli, trachelo mastöideus, transversalis colli, longissimus dorsi; *anteriorly* it lies upon recti capitis postici majores, et minores, et obliqui, semispinalis colli et dorsi, multifidi spinæ; upon the occipital artery, and posterior branches of the cervical nerves.
- Use.* To draw the head backwards, or to one side.

### TRACHELO MASTÖIDEUS, OR COMPLEXUS MINOR.

(*Trachelo mastoidien*. Dumas.)

- Arises* From the transverse processes of the three superior dorsal vertebræ, and from the five inferior cervical.
- Inserted* Into the mastoid process of the temporal bone.
- Situation.* It is covered *posteriorly* by the splenius capitis, by the transversalis; *anteriorly* it lies upon the obliquus capitis, complexus major, and occipital arteries.
- Use.* To assist in extending the head and to carry it to one side.

### CERVICALIS ASCENDENS.

This muscle forms a part of the sacro lumbalis.

- Arises* From the six superior ribs.  
*Inserted* Into the transverse processes of the fourth, fifth, and sixth cervical vertebræ.  
*Situation.* Between the splenius colli and levator scapulæ.

### TRANSVERSALIS COLLI.

This muscle forms a part of the longissimus dorsi.

- Arises* From the transverse processes of the five or six superior dorsal vertebræ.  
*Inserted* Into the transverse processes of most of the cervical.  
*Situation.* It lies between the cervicalis ascendens and trachelo-mastöideus.  
*Use* Of these two muscles is to extend the neck, and to turn it laterally, the former muscles will assist in inspiration by drawing upwards the ribs.

The last layer of muscles consists of the rectus capitis posticus major and minor, obliquus capitis superior and inferior, semispinales colli et dorsi, multifidi spinæ, interspinales-cervicis, dorsi et lumborum, intertransversalis cervicis, dorsi et lumborum.

### RECTUS CAPITIS POSTICUS MAJOR.

(*Axöido-occipitalis*. Chauss.)  
 (*Spini-axöidi-occipital*. Dumas.)

- Arises* From the spinous process of the vertebra dentata.  
*Inserted* Into the inferior transverse ridge of the os occipitis.  
*Situation.* It is in apposition *posteriorly* with the superior oblique and complexus major, *anteriorly* it lies upon the occipital bone, the posterior portion of the atlas, and upon the rectus posticus minor. This muscle with the obliqui forms a triangular space in which is lodged the vertebral artery, also the sub-occipital nerve.

*Use.* To draw the head backwards.

## RECTUS CAPITIS POSTICUS MINOR.

(*Atlöido-occipitalis*. Chauss.)  
(*Tuber-atlöido-occipital*. Dumas.)

*Arises* From the tubercle of the atlas.  
*Inserted* Into the lower transverse ridge of the os occipitis.  
*Situation.* It is covered *posteriorly* by the rectus major.  
*Use.* To assist the former muscle in its action.

## OBLIQUUS CAPITIS SUPERIOR.

(*Atlöido-sub-mastöideus*. Chauss.)  
(*Trachelo-atlöido-occipital*. Dumas.)

*Arises* From the transverse process of the atlas.  
*Inserted* Into the inferior transverse ridge of the os occipitis and posterior part of the mastoid process of the temporal bone.  
*Situation.* *Posteriorly* it is covered by the complexus, and splenius; *anteriorly* it lies upon the vertebral artery, occipital vessels, and rectus posticus major.  
*Use.* To draw the head obliquely backwards and to one side.

## OBLIQUUS CAPITIS INFERIOR.

(*Axöido-atlöideus*. Chauss.)  
(*Spini-axöido-tracheli-atlöidien*. Dumas.)

*Arises* From the spinous process of the vertebra dentata.  
*Inserted* Into the transverse process of the atlas.  
*Situation.* *Posteriorly* it is covered by the complexus major; *anteriorly* it lies upon the ligamenta subflava and vertebral vessels.  
*Use.* It assists in turning the head to one side and in pulling it backwards.

## SEMI-SPINALIS COLLI.

(Transverso-spinalis-colli. Chauss. and Dumas.)

- Arises* From the transverse processes of the seven superior dorsal vertebræ.
- Inserted* Into the spinous processes of the second, third, fourth, fifth, and sixth cervical vertebræ.
- Situation.* *Posteriorly* it is covered by the complexus major; *anteriorly* it lies upon the multifidus spinæ and semispinalis dorsi, and deep cervical vessels.
- Use.* To extend the neck obliquely backwards.

## SEMI-SPINALIS DORSI.

(Transverso-spinalis-dorsi. Chauss.)

This muscle is placed nearer to the spine than the lower part of the preceding muscle.

- Arises* From the transverse processes of the eighth, ninth, and tenth dorsal vertebræ.
- Inserted* Into the spinous processes of the dorsal vertebræ, above the eight, and into the two inferior cervical.
- Situation.* *Posteriorly* it is covered by the semispinalis colli, complexus and transversalis; *anteriorly* it lies upon the multifidus spinæ.
- Use.* It serves to pull the spine obliquely backwards.

## MULTIFIDUS SPINÆ.

We have a series of muscular and tendinous fibres, passing from the spinous processes of the lumbar, dorsal, and four inferior cervical vertebræ, *inserted* into the spinous processes of the vertebræ, with the exception of the first.

- Use.* To draw the spine directly backwards.

## INTERSPINALES CERVICIS, DORSI, ET LUMBORUM.

The spaces between the spinous processes of the different vertebra are filled up by muscular fibres.

*Use.* To approximate the spinous processes.

## INTER-TRANSVERSALIS CERVICES, DORSI ET LUMBORUM.

The spaces between the transverse processes are filled up by muscular and tendinous fibres, these muscles are covered *posteriorly* by the multifidi spinæ, *anteriorly* they lie upon the different processes of the vertebræ, the ligamenta subflava and the various ligaments of the ribs.

*Use.* To approximate the transverse processes and to turn the spine a little to one side.

*Muscles situated at the anterior part of the chest.*

### PECTORALIS MAJOR.

(*Sterno humeralis.* Chauss.)

(*Sterno-costo-clavio-humeral.* Dumas.)

*Arises* By three orders of fibres, from the two anterior thirds of the clavicle, from the whole length of the sternum, from the cartilages of the fifth, sixth, and seventh ribs.

*Inserted* Into the outer edge of the bicipital groove.

*Situation.* *Anteriorly* it is covered by the playtisma myöides; the superficial fasciæ, and mammary gland, *posteriorly* it lies upon the clavicle, sternum, and cartilages of the ribs; upon the external intercostals, sub clavus, pectoralis minor, coraco-brachialis, and biceps; upon the thoracic vessels and nerves; upon the axiliary vessels and



chial plexus of nerves: the *superior* border is contiguous to the deltoid, to the cephalic vein, and arteria thoracica acromialis: the *internal* border is connected to the opposite muscle; the *inferior* border is rounded and thick, externally forming the anterior border of the axilla.

*Use.* To carry the arm across the chest, to raise the ribs, as in difficult inspiration; the inferior fibres will also assist in raising the trunk.

### PECTORALIS MINOR.

(*Costo-coracöideus*. Chauss. and Dumas.)

*Arises* From the third, fourth and fifth ribs near their cartilages.

*Inserted* Into the coracoid process by a tendon which is continuous with those of the coracobrachialis and biceps.

*Situation.* *Anteriorly* it is covered by fascia, by the pectoralis major and by the thoracic vessels and nerves; *posteriorly* it lies upon the ribs, the external intercostals, serratus magnus; upon branches of the thoracic vessels; upon the axillary vessels and axillary plexus of nerves.

*Use.* To bring the scapula downwards and forwards to elevate the ribs.

### SUBCLAVIUS.

(*Costo-clavius*. Chauss. and Dumas.)

*Arises* From the cartilage of the first rib.

*Inserted* Into the under surface of the clavicle.

*Situation.* It is covered by fascia and the pectoralis major, it lies upon the axillary vessels and plexus of nerves.

*Use.* To draw down the clavicle, to raise the first

rib, and to diminish the pressure the clavicle must make on the vessels and nerves when the arm is carried backwards.

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*Muscles situated on the lateral parts of the Chest, and behind the Sternum.*

### SERRATUS MAGNUS.

(*Costo-scapularis*. Chauss.)  
(*Costo-basi-scapulaire*. Dumas.)

- Arises** By nine slips from the nine superior ribs.  
**Inserted** Into the base of the scapula internally.  
**Situation.** *Anteriorly* it is covered by the latissimus dorsi, pectoralis major and minor, scaleni, subscapularis, by the maxillary vessels and nerves; *posteriorly* it lies upon the ribs, intercostals, and behind upon the serratus posticus superior.  
**Use.** To carry the shoulder forwards and downwards, to raise the ribs.

### INTERCOSTALES EXTERNI.

(*Inter-lateri costaux*. Dumas.)

- Arise** From the transverse processes of the dorsal vertebræ, and from the inferior acute edge of each superior rib.  
**Inserted** Into the superior border of each inferior rib as far as its cartilage.  
**Situation.** *Externally* they are covered posteriorly by the sacro-lumbalis, longissimus dorsi, serratus posticus superior and inferior rhomboides, trapezius; *laterally* by the serratus magnus; *anteriorly* by the pectoralis major and minor, and obliquus abdominis externus. Their *internal surfaces* are in contact with the pleura, between the tubercles and angles of the ribs, separated by the inter-

costal vessels and nerves: from the angles to the cartilages of the ribs, they lie upon the internal intercostal muscles and vessels.

## INTERCOSTALES INTERNI.

(*Les sous-costaux.* Dumas.)

- Arises* From the sternum, from the lower edge of the cartilages of the ribs, extending as far as the angles.
- Inserted* Into the superior border of each inferior rib and cartilage.
- Situation.* *Externally* they are covered by the intercostales externi, as far as the cartilages of the ribs, by the pectorals and abdominal muscles; *internally* they lie upon the pleura triangularis sterni, and diaphragm.
- Use of both sets of muscles* To draw the ribs upwards and outwards, and to thus encrease the capacity of the chest.

Sometimes one, two, or more intercostales externi pass from the transverse processes of the vertebræ, over one, two, or more ribs: these have been termed *levator costarum longiores et breviores*. A similar course is sometimes described by the internal intercostals, and these slips have been erroneously named *depressores costarum proprii*. These portions of both rows assist in raising the ribs in the same manner as the rest of the intercostals.

## TRIANGULARIS STERNI.

(*Sterno-costalis.* Chauss et Dumas.)

- Arises* From the cartilago ensiformis, and lower third of the sternum,
- Inserted* Into the cartilages of the second, third, fourth, and fifth ribs.
- Situation.* *Posteriorly* it is covered by the pleura; *anteriorly* by the cartilages of the ribs, by the sternum, internal intercostals, and by the internal mammary vessels.

**Use:** To depress and draw inwards the cartilages of the ribs, and thus to diminish the capacity of the chest.

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### *Of the Muscles of the Superior Extremity.*

The muscles of the shoulder are the deltoid, supraspinatus, infra-spinatus, teres major, teres minor, and subscapularis.

The muscles of the upper arm are covered by an aponeurosis, termed the brachial aponeurosis. *Externally*, it is covered by the integuments, cutaneous veins and nerves; *internally* it covers the different muscles, vessels, and nerves, and firmly adheres to the lateral borders of the humerus, thus separating the muscles of the fore part of the arm from those of the back part; *superiorly* it is strengthened by tendinous fibres, derived from the deltoid, pectoralis major and latissimus dorsi; it covers the deltoid, and adheres to the acromion and spine of the scapula; *internally* it is lost in the cellular tissue of the axilla; *inferiorly*, it is continuous with the anti-brachial fascia. *Use*—It binds down the muscles, thus encreasing their power. This fascia is tightened by the pectoral major.

### DELTOIDES.

(*Sub-acromio-humeralis*: Chauss.)

(*Sous-acromio-clavi-humeral*: Dumas.)

**Arises** From the scapular third of the clavicle, from the whole extent of the acromion and spine of the scapula.

**Inserted** Into the middle and external border of the os humeri.

**Situation** *Externally* it is covered by the brachial fascia and a few of the fibres of the platysma myoides; *internally* it lies upon the coracoid process, the external surface of the humerus; upon the triangular ligament and fibrous capsule; upon the infra spina-

tus, teres minor, biceps, coraco-brachialis, pectorales major; upon the external circumflex vessels and nerves.

*Use.* To raise the arm directly upwards, outwards, or backwards; if the arm be fixed, to depress the shoulder.

### SUPRA SPINATUS.

(*Super-scapulo-trochitereus parvus.* Chauss.)  
(*Supra-spinatierien.* Dumas.)

*Arises* From the supra spinata, from the spine of the scapula.  
*Ins* Greater tubercle.  
*Situ* Covered by fascia, triangularis and deltoid; *anteriorly* on the scapula, supra scapular vessels, and upon the fibrous capsule of the scapulo-humeral articulation.  
*Use* To raise the arm.

### INATUS.

(*Super-scapulo-trochitereus magnus.* Chauss.)

*Arises* From the fossa infra spinata spine, and posterior costa.  
*Inserted* Into the greater tubercle  
*Situation.* It is covered *posteriorly* by a strong fascia; by the deltoid and latissimus dorsi; *internally* it lies upon the scapula, the infra scapular vessels and nerves, and upon the fibrous capsule of the shoulder joint.  
*Use.* To raise the arm, and roll it outwards when raised.

## TERES MINOR.

(Super scapulo trochitereus minimus. Chauss.)

(Margini suo scapulo-trochiterien. Dumas.)

- Arises* From the inferior costa, extending to the neck of the scapula.
- Inserted* Into the greater tubercle.
- Situation.* *Posteriorly* it is covered by the deltoid; *inferiorly* it covers the infra scapular vessels, the long head of the triceps, and the fibrous capsule of the scapulo-humeral articulation.
- Use.* To draw the humerus downwards and backwards, and to roll it outwards.

## TERES MAJOR.

(Scapulo-humeralis. Chauss.)

(Anguli-scapulo-humeral. Dumas.)

- Arises* From the inferior angle of the scapula.
- Inserted* Into the inner border of the bicipital groove.
- Situation.* *Posteriorly* it is covered by the latissimus dorsi; *anteriorly* it is in apposition with the biceps, coraco-brachialis subscapularis, and with the axillary vessels and nerves.
- Use.* To roll the humerus inwards, to draw it downwards and backwards.

## SUBSCAPULARIS.

(Sub-scapulo-trochineus. Chauss. &amp; Dumas.)

- Arises* From the fossa subscapularis, from the posterior, superior, and anterior costæ internally.
- Inserted* Into the smaller tubercle.
- Situation.* *Anteriorly* it lies against the serratus magnus, the coraco-brachialis, short head of the biceps, axillary vessels and nerves; *externally* it covers the bone, fibrous capsule of

the joint and branches of the subscapular vessels.

*Use.* To roll the humerus inwards and draw it to the side.

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### *Muscles of the Arm.*

These Muscles are, *anteriorly*, the biceps and brachialis anticus; *posteriorly*, the triceps; *internally*, the coraco-brachialis.

### BICEPS.

(*Scapulo-radialis*. Chauss.)

(*Scapulo-coraco-radial*. Dumas.)

*Arises* By two heads, the long head from the top of the glenoid cavity; short head from the coracoid process.

*Inserted* Into the tubercle of the radius.

*Situation.* It is covered by fascia, deltoid, pectoralis major, and capsule of the joint; *posteriorly* it lies upon the humerus, coraco-brachialis, brachialis anticus, and upon the musculo-cutaneous nerve; *the inner border* corresponds with the coraco-brachialis, brachial artery, basilic vein, and median nerve.

*Use.* To bend the fore arm upon the upper arm, to supine the hand, and to tighten the antibrachial fascia.

### CORACO-BRACHIALIS.

(*Coraco humeralis*. Chauss. and Dumas.)

*Arises* From the coracoid process of the scapular.

*Inserted* Into the middle of the humerus internally.

*Situation.* *Anteriorly* it is covered by the pectoralis major and deltoid; *posteriorly* it lies upon the subscapularis, teres major, and latissimus dorsi; upon the musculo cutaneous nerve; *the outer border* is partly concealed.

by the biceps; *the inner border is in apposition with the brachial artery, and basilic vein, and median nerve.*

*Use.* To raise the arm upwards and inwards.

## BRACHIALIS ANTICUS.

(*Humero-ulnaris.* Chauss. and Dumas.)

*Arises* From the humerus on either side the insertion of the deltoid.

*Inserted* Into the coronoid process of the ulna.

*Situation.* *Anteriorly* it is covered by the biceps, pronator radii teres; by the brachial artery and its branches; by the basilic vein; by the median, ulnar, musculo cutaneous, and internal cutaneous nerves, *posteriorly* it lies upon the humerus, and humero-cubital articulation.

*Use.* To bend the arm.

## TRICEPS.

(*Olecrano-scapularis.* Chauss.)

(*Tri-scapulo-humero-olecrani.* Dumas.)

*Arises* By three heads; the long head from the edge of the scapula near its neck, the second, from the posterior surface of the humerus below the head; the third, from the middle of the humerus internally.

*Inserted* Into the olecranon process of the ulna.

*Situation.* *Posteriorly* it is covered by the deltoid and teres minor; *anteriorly* it lies against the neck of the humerus, the body of the humerus, the fibrous capsule of the scapulo-humeral articulation, the synovial capsule of the humero cubital articulation against the teres major, subscapularis, latissimus dorsi; against the profunda branches of the brachial artery, and lastly upon the spiral nerve.

*Use.* Powerfully to extend the fore arm,



*Muscles of the Fore Arm.*

On removing the integuments we expose a strong fascia—the anti-brachial fascia—it proceeds anteriorly from the condyles of the humerus and triceps, posteriorly from the triceps. It dips down between the muscles and forms the intermuscular ligaments. *The anterior surface* is covered on the radial side by the vena cephalica, on the ulnar side by the vena basilica; and between them both anteriorly are placed the venæ medianæ, posteriorly are numerous venous branches; it is also covered by branches from the spiral, musculo-cutaneous, and cutaneus internus nerves; *posteriorly* it covers the superficial muscles to which it adheres at the upper parts; *superiorly* it is continuous with the brachial aponeurosis with the aponeurosis of the biceps and triceps, with the periosteum of the condyles of the humerus; *inferiorly* it is continuous with the anterior and posterior annular ligaments of the wrist joint and with the palmar fascia.

These may be divided into four layers, the first layer consists of

## 1. PRONATOR RADII TERES.

(*Epitrochlo radialis*. Chauss. and Dumas.)

- Arises* From the inner condyle and coronoid process of the ulna, the two origins are separated by the median nerve.
- Inserted* Into the middle of the humerus externally.
- Situation* *Anteriorly* it is covered by fascia by the radial artery, and superficial branch of the spiral nerve by the supinator radii longus; *posteriorly* it lies upon the brachialis anticus, flexor sublimis, ulnar artery, median nerve; *internally* it is in connection with the flexor carpi radialis; *externally* it forms with the supinator radii longus a triangular space in which is placed *on the outer side* the tendon of the biceps, *on the inner* the median nerve and *between* both the brachial artery.

*Use.* To roll the radius inwards to pronate the hand.

## 2. FLEXOR CARPI RADIALIS.

(*Epitrochlo-metacarpus*. Chauss. and Dumas.)

*Arises* from the inner condyle and coronoid process of the ulna.

*Inserted* Into the metacarpal bone of the fore finger.

*Situation.* *Anteriorly* it is covered by fascia, by the annular ligament, the abductor and opposens pollicis; *posteriorly* it lies upon the flexor sublimis, flexor longus pollicis, radio-carpal articulation; *superiorly*, on the outer side, it is in apposition with the pronator radii teres; with the palmaris longus on the inner: its tendon lies between the supinator radii longus and palmaris longus.

*Use.* To bend the wrist.

## 3. PALMARIS LONGUS.

(*Epitrochlo-palmaris*. Chauss.)

(*Epitrochlo carpi-palmaire*. Dumas.)

*Arises* From the inner condyle of the humerus.

*Inserted* Into the annular ligament and palmar fascia.

*Situation.* *Anteriorly* it is covered by fascia; *posteriorly* it lies upon the flexor sublimis; *externally* it is in apposition with the flexor carpi radialis; *internally* with the flexor carpi ulnaris.

*Use.* To tighten the palmar fascia, and to assist in bending the wrist.

## 4. FLEXOR CARPI ULNARIS.

(*Epitrochlo-carpalis*: Chauss.)

(*Epitrochlo-cubito-carpien*: Dumas.)

*Arises* From the inner condyle and the side of the

olecranon the two origins are separated by the ulnar nerve.

*Inserted* Into the os orbiculare.

*Situation* *Anteriorly* it is covered by fascia. *Posteriorly* it lies upon the flexor sublimis, pronator quadratus, ulnar vessels and nerve.

*Use* To assist in bending the wrist.

The second layer consists of

### 1. FLEXOR DIGITORUM SUBLIMIS PERFORATUS.

(*Epitrochlo-phalangeus*. Chauss.)

(*Epitrochlo-coroni-phalangenien*. Dumas.)

*Arises* From the inner condyle, from the coronoid process of the ulna, and from the middle of the radius.

*Inserted* Into the anterior part of second phalanx, each tendon is divided for the passage of a tendon of the flexor profundus.

*Situation.* *The anterior surface* is covered by the preceding muscles, by the annular ligament, the palmar fascia, the superficial palmar arch of arteries, and the branches of the median nerve; *the posterior surface* lies upon the flexor profundus, flexor longus pollicis, lumbricales, upon the ulnar artery, median and ulnar nerves.

*Use.* To bend the fingers and to assist in bending the wrist.

The third layer consists of

### 1. FLEXOR DIGITORUM PROFUNDUS PFRFORANS.

(*Ulna sub unguinalis*. Chauss.)

(*Cubito-phalangenien commun*. Dumas.)

*Arises* From the coronoid process of the ulna, from the upper two-thirds of the ulna, and from the interosseous ligament.

**Inserted** Into the extreme phalanges.

**Situation.** *Anteriorly* it is covered by the flexor sublimis, flexor carpi ulnaris, ulnar vessels, median and ulnar nerve; *posteriorly* it lies upon the ulna, the interosseous ligament, the radio-carpal articulation, pronator quadratus, flexor brevis pollicis, adductor pollicis, interossei; *externally* it is separated from the flexor longus pollicis by the anterior interosseal artery.

**Use.** To bend the fingers, to assist in bending the wrist.

## 2. FLEXOR LONGUS POLLICIS.

(*Radio-sub unguialis. Chauss.*)

(*Radio-phalangeal du pouce. Dumas.*)

**Arises** From the radius between the tubercle and insertion of the pronator radii teres, from the interosseous ligament, from the internal condyle.

**Inserted** Into the extreme phalanx of the thumb.

**Situation.** *Anteriorly* it is covered by the flexor sublimis, supinator radii longus, by the radial vessels and superficial branch of the spiral nerve; *posteriorly* it lies upon the radius, interosseous ligament, pronator quadratus, the radio-carpal articulation; its tendon passes between the two origins of the flexor brevis.

**Use.** To bend the last phalanx of the thumb, to assist in bending the wrist.

The fourth layer is formed by the

## PRONATOR QUADRATUS.

(*Ulna-radialis. Chauss. Cubito radial. Dumas.*)

**Arises** From the lower extremity of the ulna for the extent of about two inches.

**Inserted** Into the lower and anterior part of the radius.

**Situation.** *Anteriorly* it is covered by the flexor profundus, flexor longus pollicis; by the radial and ulnar vessels, by the ulnar nerve; *posteriorly* it lies upon the interosseous ligament, the lower end of the radius, and ulna.

**Use.** To roll the radius inwards, to pronate the hand.

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*Muscles on the radial and posterior surface of the Fore-arm.*

### SUPINATOR RADII LONGUS.

(*Humero-super-radialis*. Chauss. & Dumas.)

**Arises** From the external border of the humerus, immediately below the insertion of the deltoid.

**Inserted** Into the styloid process of the radius.

**Situation.** At its origin the brachialis anticus is placed in *front*, *posteriorly* the triceps, *above* the deltoid, *below* the extensor carpi radialis longior; *anteriorly* it is covered by fascia; *posteriorly* it lies upon the extensor carpi radialis longior supinator brevis, flexor carpi radialis, flexor longus pollicis, above the spiral nerve is placed to its inner side, below the radial artery and superficial branch of the spiral nerve are placed between it and the flexor carpi radialis.

**Use.** To turn the radius outwards, to supinate the hand.

## EXTENSOR CARPI RADIALIS LONGIOR.

*(Humero-super carpeus. Chauss. & Dumas.)*

**Arises** From one external border of the humerus, below the preceding muscle.

**Inserted** Into the metacarpal bone of the fore finger.

**Situation.** At its origin it has the brachialis anticus on its *inner* side; *posteriorly* the triceps; *above* the supinator radii longus, below the extensor carpi radialis brevior: it is *covered, anteriorly*, by the preceding muscle, by the extensor ossis metacarpi pollicis, by the extensor primi internodii; it lies upon the supinator radii brevis, the extensor carpi radialis brevior.

**Use.** To assist in extending the wrist.

## EXTENSOR CARPI RADIALIS BREVIOR.

*(Epicondilo-super-metacarpeus. Chauss. & Dumas.)*

**Arises** From the outer condyle of the humerus and ridge above that process.

**Inserted** Into the metacarpal bone of the second finger.

**Situation.** *Anteriorly* it is covered by the extensor carpi radialis longior, supinator radii longus, extensor ossis metacarpi pollicis, extensor primi et secundi internodii; *anteriorly* it lies upon the supinator radii brevis and radio-carpal articulation; *the inner and posterior* margin is in apposition with the extensor communis digitorum.

**Use.** To assist in extending the wrist.

## EXTENSOR DIGITORUM COMMUNIS.

*(Epicondilo-super-unguialis. Chauss. & Dumas.)*

**Arises** From the outer condyle of the humerus and fascia.

**Inserted** Into the posterior surface of all the phalanges.

**Situation.** *Posteriorly* it is covered by fascia and by the

posterior annular ligament; *anteriorly* it lies upon the supinator brevis, extensores pollicis extensor indicis, radio-carpal articulation interossei.

*Use.* To extend the fingers.

### EXTENSOR CARPI ULNARIS.

(*Ulna-super-metacarpeus.* Chauss.)

(*Epicondylo-cubito-sus-metacarpien.* Dumas.)

*Arises* From the outer condyle and intermuscular ligaments.

*Inserted* Into the posterior part of the metacarpal bone of the little finger.

*Situation.* It is covered *posteriorly* by fascia, by the posterior annular ligament; *anteriorly* it lies upon the supinator radii brevis, extensores pollicis, extensor indicis.

*Use.* To assist in the extension of the wrist.

### EXTENSOR MINIMI DIGITI.

(*Epicondylo-sus-phalangeal du petit doigt.* Dumas.)

This is nothing more than an ulnar slip of the common extensor passing through a separate depression of the radius, and through a separate sheath in the annular ligament.

*Use.* To extend the little finger.

### ANCONEURUS.

(*Epicondylo-ulnaris.* Chauss.)

(*Epicondylo-cubital.* Dumas.)

*Arises* From the external condyle of the humerus.

*Inserted* Into the outer border of the olecranon.

*Situation.* *Posteriorly* it is covered by fascia; *anteriorly* it lies upon the synovial capsule of the humero-radial articulation, external lateral ligament, coronary ligament of the

radius ; and upon the supinator radii brevis.

*Use.* It assists in extending the fore-arm.

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*Deep-seated Muscles of the posterior part of the Fore-arm*

**SUPINATOR RADII BREVIS.**

(*Epicondyloradialis*. Chauss. & Dumas.)

*Arises* From the external condyle of the humerus, from the outer and upper part of the ulnar.

*Inserted* Into the upper and fore part of the radius.

*Situation.* It is covered by the pronator radii teres, radial artery and superficial branch of the spiral nerve, supinator radii longus, extensor communis et ulnaris anconæus ; *anteriorly* it lies upon a portion of the radius and ulna, upon the synovial capsule of the cubito humeral articulation, external lateral and annular ligament.

*Use.* To roll the radius outwards, to supine the hand.

**EXTENSOR OSSIS METACARPI POLLICIS.**

(*Ulnosupermetacarpeus pollicis*. Chauss.)

(*Cubitoradiometacarpium du pouce*. Dumas.)

*Arises* From the middle and posterior part of the ulna.

*Inserted* Into the os trapezium and metacarpal bone of the thumb.

*Use.* To extend the first phalanx of the thumb obliquely outwards.



## EXTENSOR PRIMI INTERNODII POLLICIS.

(*Ulna-super-phalangeus primus pollicis.* Chauss.)  
 (*Cubito-sus-phalangien du pouce.* Dumas.)

- Arises* From the posterior surface above its middle, and from the interosseous ligament.  
*Inserted* Into the posterior part of the first phalanx.  
*Use* To extend the first phalanx obliquely outwards.

## EXTENSOR SECUNDI INTERNODII POLLICIS.

(*Ulna-super-phalangeus secundus pollicis.* Chauss.)

- Arises* From the posterior part of the ulna and interosseous ligament; its belly partly conceals the origin of the two other extensors.  
*Inserted* Into the extreme phalanx of the thumb.  
*Use.* To extend the last joint of the thumb obliquely backwards.  
*Situation* Of the extensors of the thumb. Their posterior surfaces are covered by the supinator radii brevis, extensor digitorum communis, extensor carpi ulnaris; their anterior surfaces cover the ulna, interosseous ligament, posterior interosseal vessels, radio-carpal articulation, radial artery, branches of the spiral nerve, and tendons of the radial extensors.

## INDICATOR.

(*Ulna-super-phalangeus primus indicis.*  
 Chauss. & Dumas.)

- Arises* From the middle and back part of the ulna, and from the interosseous ligament.  
*Inserted* Into the extreme phalanx of the fore finger.  
*Situation.* It is covered by the extensor communis; anteriorly it lies upon the extensor secundi internodii.  
*Use* To assist in extending the fore-finger.

### *Of the Muscles of the Hand.*

The ball of the thumb is formed by the abductor, opponens, flexor brevis, and adductor pollicis: the ball of the little finger is constituted by the abductor, flexor brevis, and adductor minimi digiti: the muscles placed in the palm of the hand are the lumbricales and inter-ossei.

These Muscles are covered by the palmar aponeurosis.

### THE PALMAR FASCIA

Extends from the annular ligament to the heads of the metacarpal bones, is remarkably dense, of a triangular shape; the *anterior* surface is covered by the integuments; the *posterior* surface lies upon the superficial palmar arch of arteries, upon the branches of the median and ulnar nerves, upon the superficial and deep flexor tendons, upon the lumbricales; its *external* margin sends off an expansion, covering the muscles of the thumb; its *inner* margin a similar one, investing the muscles of the little finger; *above* it is continuous with the fibres of the annular ligament, and aponeurosis of the palmaris longus; *inferiorly* it divides into four slips, which are connected by transverse fibres, these slips separate the tendons of the fingers, and adhere to the heads of the metacarpal bones.

### PALMARIS BREVIS.

(*Palmaris cutaneus.* Chauss. & Dumas.)

- Arises* From the annular ligament, and inner border of the palmar fascia.
- Inserted* Into the integument covering the little finger.
- Situation.* *Anteriorly* it is covered by the integuments; *posteriorly* it lies upon the ulnar artery and nerve, upon the adductor and flexor brevis, minimi digiti.
- Use.* To assist in contracting the palm of the hand.

## ABDUCTOR POLLICIS.

(*Carpo-super phalangeus*. Chauss.)  
 (*Carpo-sus-phalangien du pouce*. Dumas.)

- Arises* From the annular ligament, os scaphoïdeum, and os trapezium.  
*Inserted* Into the root of the first phalanx of the thumb.  
*Situation.* *Anteriorly* it is covered by the expansion of the palmar fascia, *posteriorly* it lies upon the opponens pollicis.  
*Use.* To abduce the thumb.

FLEXOR OSSIS METACARPI POLLICIS, OR  
OPPONENS POLLICIS.

(*Carpo-metacarpalis*. Chauss.)  
 (*Carpo-phalangien du pouce*. Dumas.)

- Arises* From the annular ligament, and os trapezium.  
*Inserted* Into the under and fore part of the metacarpal bone of the thumb.  
*Situation.* It is covered by the abductor pollicis and fascia; it lies upon the flexor brevis, and carpo-metacarpal articulation of the thumb.  
*Use.* To bring the thumb inwards, and make it oppose the fingers.

## FLEXOR BREVIS POLLICIS MANUS.

(*Carpo phalangeus*. Chauss. & Dumas.)

- Arises* From the os trapezöideum, os magnum and os unciforme.  
*Inserted* Into the base of the first phalanx and ossa sesamöidea.  
*Situation.* It lies under the abductor pollicis; it is divided into two portions by the flexor longus; it lies upon the tendon of the flexor carpi radialis.  
*Use.* It bends the first phalanx of the thumb.

## ADDUCTOR POLLICIS MANUS.

(*Metacarpo-phalangeus pollicis*. Chauss. et Dumas.)

- Arises** From the metacarpal bone of the middle finger, crosses the metacarpal bone of the fore-finger.
- Inserted** Into the root of the first phalanx of the thumb.
- Situation.** It lies under the tendons of the flexor profundus and lumbricales, upon the inter-ossei.
- Use.** To bring the thumb inwards towards the fingers.

## ABDUCTOR MINIMI DIGITI.

(*Carpo-metacarpeus minimi digiti*. Chauss. et Dumas.)

- Arises** From the os orbiculare and annular ligament.
- Inserted** Into the inner side of the first phalanx.
- Situation.** It is covered by the expansion from the palmar fascia, it lies upon the flexor brevis.
- Use.** To draw the little finger from the other fingers.

## FLEXOR BREVIS MINIMI DIGITI.

(*Carpo-phalangeus secundus*. Dumas et Chauss.)

- Arises** From the os cunëiforme and annular ligament.
- Inserted** Into the base of the first phalanx of the little finger.
- Situation.** It is placed on the same plane with the abductor, and lies partly upon the adductor minimi digiti.
- Use.** To flex the first phalanx of the little finger.

## ADDUCTOR MINIMI DIGITI.

(*Carpo-metacarpeus minimi digiti*.)

- Arises** From the os unciforme, from the annular ligament.

- Inserted** Into the whole length of the outer border of the metacarpal bone of the little finger.
- Situation.** It is covered by the abductor and flexor brevis minimi digiti.
- Use.** To adduce the little finger.

## LUMBRICALES.

(*Palmo-phalangei.* Chauss.)  
(*Annuli-tendino-phalangiens.* Dumas.)

- Arise** These four muscular slips are connected to the tendons of the flexor sublimis digitorum.
- Inserted** Into the sides of the first phalanges of the fingers, into the posterior surfaces of the second phalanges.
- Use.** To bend the first phalanges, to extend the second phalanges.

## INTEROSSEI.

On removing the preceding muscle, we expose the interossei; there are two strata, an external and internal. These muscles take their origin from the sides of the metacarpal bones, and are fixed by slender tendons into the tendinous expansions of the extensor digitorum communis. By these muscles the fingers are moved laterally, they also assist in bending or extending the phalanges of the fingers.

There are four interossei interni in the palm of the hand.

The first, called *prior indicis* is inserted into the outer border of the first phalanx of the fore finger.

The second, called *posterior indicis* is inserted into the inner border of the first phalanx of the fore finger.

The third, called *prior annularis* is inserted into the outer side of the first phalanx of the ring finger.

The fourth called *interosseous auricularis* is inserted into the outer border of the first phalanx of the little finger.

All these muscles arise from the corresponding borders of the metacarpal bones.

There are only three *interossei externi* called bicipites; these are larger than the internal, and are situated between the metacarpal bones on the back of the hand.

The first called the *prior medii*, is inserted into the outer side of the middle finger.

The second called *posterior medii*, is inserted into the inner border of the middle finger.

The third called *posterior auricularis*, is inserted into the inner side of the ring finger.

These muscles also arise from corresponding borders of the metacarpal bones, each by two heads.

*Use.* Each bends its finger backwards, or draws it from the thumb, and bends it somewhat inwards.

### ABDUCTOR INDICIS.

*Arises* From the os trapezium, and from the metacarpal bone of the thumb.

*Inserted* Into the outer side of the root of the first phalanx.

*Situation.* *Anteriorly* it lies against the adductor pollicis, and radial artery; *posteriorly* it is covered by the integuments.

*Use.* To abduce the fore finger, to assist in adducing the thumb.

### *Muscles of the Abdomen.*

On removing the integuments we expose the subcutaneous cellular tissue, formed of two layers; the first encloses adipose vesicles, always more numerous over the inguinal, then over the umbilical region: the second layer forms the superficial fascia. In this, as in other parts of the body, the nature of the superficial fascia varies; it is formed of condensed cellular membrane, and has the appearance of a true aponeurosis. In addition to covering the abdomen, *superiorly* it may be traced continuous with the fascia covering the pectoralis major, even up to the neck, where it is connected

with the superficial cervical fascia. In front of the abdomen, this membrane is white and transparent, it covers the inguinal ring, passes into the scrotum; it is also spread over the thigh as far as the knee; it also affords a covering to the muscles of the perinæum. The subcutaneous vessels of this region ramify between its layers. On removing this fascia, we observe that the abdomen from the ensiform cartilage, to about two inches below the umbilicus is covered in front by a sheath of tendon, on the sides by muscular fibres; below the point mentioned the tendon expands, and covers the whole extent of the lower part of the abdomen. There are seen certain lines strongly marked on the fore part and sides of the abdomen. The first termed *linea alba*, commences at the ensiform cartilage, and terminates at symphysis pubis; about two inches on either side is a semilunar line, *linea semilunaris*. It commences from the greatest convexity of the eighth rib, and terminates at the symphysis pubis. We may observe also, tendinous lines intersecting the recti muscles, *lineæ transversæ*, three above, half a one below the umbilicus. In the broad tendon covering the front and lower part of the abdomen, are three important openings: viz. the *umbilical*, situated in the centre of the *linea alba*, for the transmission of the umbilical cord in the foetus, and the *external abdominal rings*, one placed on either side between the tubercle and symphysis pubis; in the male giving passage to the spermatic cord, in the female to the round ligament of the uterus. We have also small openings in the central tendon for the passage of twigs of nerves, and small blood vessels.

The muscles of the abdomen are five pairs, three pairs situated on the sides, two pairs in front.

### OBLIQUUS ABDOMINIS EXTERNUS DESCENDENS.

(*Costo-abdominalis*. Chauss.)  
(*Ilio-pubi-costo-abdominal*. Dumas)

*Arises* By eight distinct slips from the eight inferior ribs near their cartilages: the five superior

slips serrate with the serratus magnus, the three inferior with the latissimus dorsi.

**Inserted** Into the two anterior thirds of the crista of the ilium, from the anterior superior spinous process, it sends off a broad tendon, which is inserted into the linea-ilio-pectinea, tubercle, and symphysis pubis, into the whole extent of the linea alba and cartilago ensiformis. The inferior border of the tendon is rounded, and termed Poupart's ligament, or crural arch, the portion inserted into the linea-ilio-pectinea, is called Gimbernat's ligament.

**Situation.** The *external surface* is covered by the latissimus dorsi posteriorly, by the superficial fascia, it lies upon the internal oblique, the rectus, cartilages of the ribs, and external intercostal muscles; the *anterior border* loses itself in the linea alba.

**Use.** To draw down the ribs, having depressed the ribs, if both muscles act to flex the trunk, if one only, it bends the body to the opposite side. They forcibly compress the abdominal viscera, thus assisting in the expulsion of the contents of the viscera, and in the female the foetus: lastly, if the ribs be raised and fixed, these muscles will elevate the pelvis.

### OBLIQUUS ABDOMINIS INTERNUS ASCENDENS.

(*Ilio-abdominalis medius*. Chauss.)  
(*Ilio-lumbo-costi-abdominal*. Dumas.)

**Arises** From the iliac half of Poupart's ligament, from the whole of the crest of the ilium, from the back part of the sacrum, from the fascia lumborum.

**Inserted** Into the symphysis pubis, into the whole extent of the linea alba, cartilago ensiformis, and six inferior ribs. At the linea semi-lunaris this muscle becomes entirely tendi-



nous, the tendon at this point separates into two layers, one layer passing in front of the rectus with the tendon of the external oblique, the other layer passing behind the rectus with the tendon of the transversalis, by this means the rectus is inclosed in a tendinous sheath. At the lower part of the abdomen the sheath is defective, the tendons all pass in front of the rectus.

*Situation.* It is covered by the external oblique, by the latissimus dorsi, it lies upon the transversalis, longissimus dorsi.

*Use.* To assist the action of the obliquus externus, if both muscles act they will bend the body to the same side.

### CREMASTER.

In the descent of the testicle from the loins in the foetus it carries with it a few of the fibres of the inter-oblique and transversalis; these are spread over the cord and are attached to the tunica vaginalis reflexa, and thus constitute this muscle. It forms one of the coverings of oblique inguinal hernia and its fibres are in these cases, sometimes remarkably thickened.

*Use.* To draw the testes upwards, towards the external ring.

### TRANSVERSALIS ABDOMINIS.

(*Lumbo-abdominalis*. Chauss.)  
(*Lumbo-ili-abdominal*. Dumas.)

*Arises* From the iliac half of Poupart's ligament, from crest of the ilium, back part of the sacrum from the four superior lumbar and last dorsal vertebræ, and from the cartilages of the seven inferior ribs.

*Inserted* Into the symphysis pubis, the whole extent of the linea alba and ensiform cartilage.



**Situation.** It is covered by the internal oblique and circumflex vessels; it lies upon the fascia transversalis.

**Use.** To support and compress the abdominal viscera, to assist in expiration.

## RECTUS ABDOMINIS.

(*Sterno-pubalis.* Chauss. *Pubio-sternal.* Dumas.)

**Arises** By two tendons from the symphysis pubis.

**Inserted** Into the cartilago ensiformis, and cartilages of the three inferior true ribs, and often intermixes with some fibres of the pectoral muscle.

**Situation.** It is covered by the tendon of the external oblique, by the aponeurosis of the pectoralis major, by the pyramidalis: it lies upon the cartilages of the three inferior true ribs, cartilago ensiformis, upon the tendon of the transversalis and posterior half of the tendon of the internal oblique. At the point where these tendons pass in front of this muscle, it there lies upon the fascia transversalis; lastly, upon the internal epigastric and internal mammary vessels.

**Use.** To compress the fore-part of the abdomen, to draw down the ribs, to bend the trunk forwards, to raise the pelvis: by its tendinous intersections, it is enabled to contract at any of the intermediate spaces.

## PYRAMIDALIS.

(*Pubo-sub-umbilicalis.* Chauss.)

**Arises** By a broad base from the symphysis pubis.

**Inserted** Into the linea by an acute termination, about two inches above the pubis.

**Situation.** Anteriorly it is covered by the abdominal aponeurosis: it lies upon the rectus.

**Use.** To assist the rectus in its action.

*Parts connected with the Abdominal Muscles.*

## OF POUPART'S LIGAMENT.

The under part of the tendon of the external oblique, stretched between the anterior superior spinous process of the ilium and symphysis pubis, is thicker and somewhat rounded. It has been described under the name of Poupart's ligament, Fallopius's ligament, and crural arch. Under it passes the psoas magnus, the iliacus internus, anterior crural and cutaneous externus nerves, femoral artery and vein, and also the absorbents of the lower extremity.

## OF GIMBERNAT'S LIGAMENT.

This ligament is nothing more than the third insertion of Poupart's ligament; it is attached from the tubercle of the pubis, to about half an inch of the commencement of the linea-ilio-pectinea; it looks upwards and outwards, and forms a boundary to the inner side of the femoral sheath.

## OF THE EXTERNAL ABDOMINAL RING.

On tracing Poupart's ligament to its insertion into the os pubis, its fibres will be found to separate into two bands, one portion is inserted into the symphysis pubis (upper column), the other into the tubercle of the pubis (lower column); the intervening space which results from their separation, is termed the external abdominal ring. It is of triangular shape; in the male it gives passage to the spermatic cord; in the female, to the round ligament of the uterus. The opening is indistinct, owing to cellular tissue connecting the cord to the edges of the ring, the fascia spermatica. The apex of the opening is rounded by some transverse bands of tendinous fibres passing from Poupart's ligament inwards, the *inter-columnal fascia*.

## OF THE FASCIA TRANSVERSALIS.

On removing the abdominal muscles will be exposed between the transversalis muscle and peritonæum, a distinct fascia, *the fascia transversalis*; it arises by two portions, the iliac or outer portion from Poupart's ligament—the pubic or inner portion from Gimbernat's; the two portions unite, leaving an opening, termed *the internal abdominal ring*; the fascia is spread over the peritonæum, and may be traced *superiorly* as high as the diaphragm, *posteriorly* as far back as the psoas magnus; dense and resisting at the lower part of the abdomen.

## OF THE INTERNAL ABDOMINAL RING.

This opening is situated midway between the spine of the ilium and symphysis pubis, about three quarters of an inch above Poupart's ligament, about an inch and a half on the iliac side of the pubis. It transmits the spermatic cord in the male, and round ligament of the uterus in the female. Although usually described as a distinct opening, it is indistinct, as the fascia transversalis is prolonged upon the cord, and lost in its cellular coverings.

## OF THE INGUINAL CANAL.

The space between the two rings is termed the inguinal canal, and is occupied by the spermatic cord. The canal is bounded *anteriorly* by the tendon of the external oblique and the margins of the internal oblique and transversalis, *below* by Poupart's ligament, *posteriorly* by the fascia transversalis, and the pubic portion of the conjoined tendons of the internal oblique and transversalis.

## SITUATION OF THE EPIGASTRIC ARTERY.

The epigastric artery arises from the external iliac artery, under Poupart's ligament; it passes upwards behind the spermatic cord towards the umbilicus, first situated behind the fascia transversalis. It is placed on

the outer side of the external ring, on the inner side of the internal abdominal ring.

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*Lumbar Region.*

**QUADRATUS LUMBORUM.**

(*Ilio-costalis*. Chauss. *Ilio-lumbi-costal*. Dumas.)

- Arises* From the posterior part of the crista of the ilium.
- Inserted* Into the transverse processes of all the lumbar vertebræ into the body of the last dorsal vertebræ and last rib.
- Situation.* *Posteriorly* it is covered by the sacro-lumbalis longissimus dorsi, and aponeurosis of the transversalis abdominis; *anteriorly* it corresponds with the diaphragm, kidney, and colon intestinum.
- Use.* To depress the last rib, to bend the loins to one side; and if both muscles, to bend the loins directly forwards.

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*Muscles situated on the lateral parts of the Trunk.*

**PSOAS MAGNUS.**

(*Præ-lumbo-trochanterus*. Chauss.)

(*Pre-lumbo-trochantien*. Dumas.)

- Arises* From the bodies and transverse processes of the last dorsal and all the lumbar vertebræ.
- Inserted* Into the trochanter minor and linea aspera.
- Situation.* *Anteriorly* it is covered by the diaphragm, psoas parvus, Poupart's ligament; by the peritoneum; by the spermatic and external iliac vessels; by the kidney and ureter; *posteriorly* it lies upon the transverse pro-

cesses of the lumbar vertebræ ; upon the ilio-lumbar ligament, and fibrous capsule of the ilio-femoral articulation ; upon the quadratus lumborum ; upon the fascia of the transversalis ; upon the anterior branches of the lumbar nerves ; upon the ilio-lumbar vessels.

*Use.* To bend the thigh upon the body, and to assist in rotating the thigh outwards ; if the thigh be fixed, to bend the trunk.

### PSOAS PARVUS.

(*Prelumbo-pubalis*. Chauss. and Dumas.)

*Arises* From the body of the last dorsal and first lumbar vertebra.

*Inserted* Into the brim of the pelvis, where the os pubis and os ilium are united.

*Situation.* *Anteriorly* it is covered by the diaphragm and peritonæum ; by the renal, spermatic, and external iliac vessels.

*Use.* To assist in bending the loins or raising the pelvis.

### ILIACUS INTERNUS.

(*Ilio-trochantinus*. Chauss. *Iliaco-trochantien*. Dumas.)

*Arises* From the transverse process of the last lumbar vertebra, and from the fossa iliaca.

*Inserted* Into the trochanter minor and linea aspera.

*Situation.* *Anteriorly* it is covered by the peritoneum, by the psoas parvus, by Poupart's ligament and sartorius, by the ilio lumbar vessels, by the lumbar nerves, by the femoral vessels and anterior crural nerve, by the cæcum on the right side and termination of the intestinum ilium, on the left by the sigmoid flexure of the colon : *posteriorly* it lies upon the ilium, pubis, and ilio-femoral articulation.

*Use.* To bend the thigh upon the pelvis.

*Muscles of the Hip.***GLUTÆUS MAXIMUS.***(Sacro-femoralis. Chauss. Ilio-sacro-femoral. Dumas.)*

**Arises** From the posterior part of the crest of the ilium, from the back part of the sacrum, and posterior sacro-sciatic ligament.

**Inserted** Into the linea aspera, below the trochanter major.

**Situation.** *Posteriorly* it is covered by the fascia lata, it lies upon the sacrum, posterior sacro-sciatic ligament, trochanter major; upon glutæus medius, pyriformis, gemelli, obturator internus, quadratus femoris and origin of the flexors of the leg; upon the great sciatic nerve.

**Use.** To extend the thigh.

**GLUTÆUS MEDIUS.***(Ilio trochanterus major. Chauss. and Dumas.)*

**Arises** From the anterior portion of the crest of the ilium, not occupied by the maximus, from the dorsum of the ilium between the crest and linea semicircularis

**Inserted** Into the trochanter major.

**Situation.** *Posteriorly* it is covered by fascia and glutæus maximus; *internally* it lies upon the glutæus minimus, gluteal vessels and nerves; the *posterior border* is parallel with the pyriformis.

**Use.** To draw the thigh outwards.

**GLUTÆUS MINIMUS.***(Ilio-trochanterus minor. Chauss. and Dumas.)*

**Arises** From the semicircular ridge on the anterior and inferior part of the dorsum of the ilium.

*Inserted* Into the trochanter major.

*Situation.* It is covered by the glutæus medius and pyriformis; it lies upon the dorsum of the ilium, the ilio femoral articulation, and deep branches of the gluteal artery.

*Use.* To assist in abducting the thigh.

### PYRIFORMIS.

(*Sacro trochanterus.* Chauss.)

(*Sacro-ili-trochanterien.* Dumas.)

*Arises* From within the pelvis, from the second, third, and fourth portions of the sacrum, leaves the pelvis at the upper sciatic opening.

*Inserted* Into the fovea of the trochanter major.

*Situation.* *Anteriorly* it is covered by the rectum, sciatic nerves, and internal iliac vessels; *posteriorly* is covered by the sacrum and glutæus maximus; it is placed between the glutæus medius and superior gemellus.

### GEMELLI.

(*Ischio-trochanteri.* Chauss.)

(*Ischio-spini-trochanterien.* Dumas.)

### GEMELLUS SUPERIOR.

*Arises* From the spine of the Ischium.

*Situation.* Between the pyriformis and obturator internus.

### GEMELLUS INFERIOR.

*Arises* From the tuberosity of the ischium.

*Situation.* Between the obturator internus, and quadratus femoris. The posterior surface of the gemelli is covered by the glutæus maximus by the great sciatic nerve, and ischiatic vessels.



- Inserted** Both muscles are inserted into the fossa of  
of the trochanter major.
- Use.** To rotate the thigh outwards.

### OBTURATOR INTERNUS.

(*Sub-pubo-trochanterus externus.* Chauss.)  
(*Intra-pelvio-trochanterien.* Dumas.)

- Arises** From the inner border of the obturator foramen and inner surface of the obturator ligament.
- Inserted** Into the fossa of the trochanter major.
- Situation.** Within the pelvis it is placed between the obturator ligament, and levator ani; afterwards its tendon lies between the gemelli; *posteriorly* it is covered by the glutæus maximus, and great sciatic nerve, and ischiatic vessels.
- Use.** To rotate the thigh outwards.

### OBTURATOR EXTERNUS

(*Sub-pubo-trochanterus externus.* Chauss.)  
(*Extra-pelvio-pubi-trochanterien.* Dumas.)

- Arises** From the outer margin of the obturator foramen and outer surface of the obturator ligament, its tendon winds around the neck of the femur, adhering to the capsular ligament.
- Inserted** Into the fossa of the trochanter major.
- Situation.** Its origin is covered by the pectinalis; it lies upon the obturator ligament; *posteriorly* it is covered by the quadratus femoris.
- Use.** To rotate the thigh outwards,

## QUADRATUS FEMORIS.

*(Ischio-trochanterus. Chauss.)**Tuber-ischio-trochanterien. Dumas.)*

- Arises** From the tuberosity of the ischiuim.
- Inserted** Into the linea quadrata.
- Situation.** It is covered by the glutæus maximus, semi-membranosus, adductor magnus, great sciatic nerve, and ischiatic vessels; *anteriorly* it lies upon the obturator externus, tendons of the psoas magnus, and iliacus internus; upon the capsule of the ilio femoral articulation.
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*Muscles situated on the external and anterior part of the Thigh.*

The muscles of the thigh are covered by a strong, dense fascia, the *fascia lata*.\* It arises from the bones

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\*On examining the fascia lata it will be found to arise by two portions—the iliac or outer portion from Poupart's ligament, the pubic or inner portion from Gimbernat's ligament. The origin of the iliac portion presents the appearance of a crescentic process; this was first accurately described by Allan Burns, and called by him *the falciform process* of the fascia lata; the pubic portion is thinner, covers the triceps, and pectinalis muscles, and dips down beneath the femoral vessels, and is united with the iliac portion beneath the vena saphena major, where that vein joins the femoral. The oval aperture between the two portions is termed *the saphenous opening*, and is occupied by the front of the femoral sheath: it is placed on the inner and fore-part of the thigh, over the pectineus muscle, below Poupart's ligament. *Femoral sheath.*—The fascia intervening between the peritoneum and transversalis abdominis (fascia transversalis) passes underneath Poupart's ligament in front of the femoral vessels and forms the front of the femoral sheath (fascia propria of some anatomists); the strong fascia covering the iliacus internus, passes over the os pubis behind the femoral vessels, and forms the posterior part of the sheath; these two layers unite at the sides, and constitute the lateral portions. The sheath thus formed is of a funnel shape, and contains on the outer side the femoral artery; on the inner side the vein which is separated from the artery by a distinct cellular septum. Between the vein and inner border of the sheath, we have a triangular space, called *the crural ring* or crural aperture. The crural ring is bounded above by Poupart's ligament, below by the os pubis, on the outer side by the femoral vein, on the inner by Gimbernat's ligament. This space is closed by a cribriform membrane (fascia cribriformus), through which the lymphatics of the inferior extremities enter the pelvis, by a small lymphatic gland. According to Sir A. Cooper this fascia is a reflected portion of the fascia transversalis. Femoral hernia enters this aperture, and continuing to descend, carries before it, through the crescentic opening of the fascia lata, the front of the femoral sheath (described under the name of fascia propria or transversalis). The coverings are the common integuments, the superficial fascia, the fascia propria, and, lastly, the peritonæum or hernial sac.

of the pelvis, from Poupart's and Gimbernat's ligament, is spread over the whole of the thigh; strong and dense on the outer part, more delicate on the anterior and inner part. The *anterior* surface is covered by the superficial fascia, saphena major vein, by small branches from the lumbar and anterior crural nerves, by a number of lymphatic vessels, and superiorly by a chain of lymphatic glands; *superiorly* it gives a covering to the glutæus maximus, and medius, adheres to the sacrum and os coccygis; *inferiorly* it is continuous with the fascia of the leg; *internally* it dips down between the triceps and vastus internus and firmly adheres to the linea aspera; *externally* between the vastus externus, and glutæus maximus above, between the vastus externus, and biceps below; thus the muscles of the anterior region are separated from those of the posterior region.

*Use.* To bend the muscles together, and to prevent their starting during action, thus increasing their power.

### TENSOR VAGINÆ FEMORIS.

(*Ilio-femoralis*. Chauss.)  
(*Ilio-aponeurosi-femoral*. Dumas.)

*Arises* From the anterior superior spinous process of the ilium.

*Inserted* Into the fascia lata, below the trochanter major.

*Situation.* *Externally* it is covered by the fascia lata; *posteriorly* it lies upon a portion of the rectus and vastus externus; *anteriorly* it is connected with the sartorius at its origin; *posteriorly* with the glutæus medius.

*Use.* To tighten the fascia lata, to abduce the thigh.

## SARTORIUS.

(*Ilio-præ-tibialis*. Chauss. *Ilio-creti-tibial*. Dumas.)

- Arises** From the anterior superior spinous process of the ilium.
- Inserted** Into the inner side of the tibia, near the inferior part of its tubercle.
- Situation.** *Anteriorly* it is covered by fascia; it lies upon the iliacus internus, psoas magnus, rectus, vastus internus, gracilis; about the middle of the thigh upon the femoral artery, vein, and nervus saphenus; upon the internal lateral ligament. The *inner border* forms, with the adductor longus, a triangular space, in which is lodged the femoral vessels.
- Use.** To bend the leg obliquely inwards, or to bring one leg across the other.

## RECTUS FEMORIS.

(*Ilio-rotularis*. Chauss. and Dumas.)

- Arises** By two heads from the anterior inferior spinous process of the ilium and dorsum of the bone above the acetabulum.
- Inserted** Into the superior border of the patella.
- Situation.** *Anteriorly* it is covered by the sartorius, and fascia lata; *posteriorly* it lies upon the capsule of the ilio-femoral articulation; upon the cruræus; upon the external circumflex vessels and descending branches; upon the muscular branches of the anterior cural nerve.
- Use.** To extend the leg upon the thigh, thigh upon the pelvis, or pelvis upon the thigh.

*Muscles of the Hip.*

## GLUTÆUS MAXIMUS.

*(Sacro-femoralis. Chauss. Ilio-sacro-femoral. Dumas.)*

*Arises* From the posterior part of the crest of the ilium, from the back part of the sacrum, and posterior sacro-sciatic ligament.

*Inserted* Into the linea aspera, below the trochanter major.

*Situation.* *Posteriorly* it is covered by the fascia lata, it lies upon the sacrum, posterior sacro-sciatic ligament, trochanter major; upon glutæus medius, pyriformis, gemelli, obturator internus, quadratus femoris and origin of the flexors of the leg; upon the great sciatic nerve.

*Use.* To extend the thigh.

## GLUTÆUS MEDIUS.

*(Ilio trochanterus major. Chauss. and Dumas.)*

*Arises* From the anterior portion of the crest of the ilium, not occupied by the maximus, from the dorsum of the ilium between the crest and linea semicircularis

*Inserted* Into the trochanter major.

*Situation.* *Posteriorly* it is covered by fascia and glutæus maximus; *internally* it lies upon the glutæus minimus, gluteal vessels and nerves; the *posterior border* is parallel with the pyriformis.

*Use.* To draw the thigh outwards.

## GLUTÆUS MINIMUS.

*(Ilio-trochanterus minor. Chauss. and Dumas.)*

*Arises* From the semicircular ridge on the anterior and inferior part of the dorsum of the ilium.

- Inserted** Into the inner border of the patella.  
**Situation.** *Anteriorly* it is covered by fascia, sartorius, and femoral vessels; it lies upon the psoas magnus, pectinalis and adductor magnus; the outer border overlaps the cruræus.  
**Use.** To assist in extending the leg.
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*Muscles situated on the inner and posterior part of the thigh.*

### PECTINALIS.

(*Pubo-femoralis*. Chauss. and Dumas.)

- Arises** From the body of the pubes.  
**Inserted** Into the linea aspera, below the trochanter minor.  
**Situation.** *Anteriorly* it is covered by the fascia lata, deep inguinal glands, and femoral vessels; *posteriorly* it lies upon the os pubis capsule of ilio-femoral articulation, upon the obturator externus, adductor brevis; upon the obturator vessels and nerves.  
**Use.** To raise the thigh upwards and inwards.

### TRICEPS ADDUCTOR LONGUS.

(*Pubo-femoralis*. Chauss. *Spini-pubio-femoral*. Dumas.)

- Arises** From the os pubis, between its tubercle and symphysis.  
**Inserted** Into the middle third of the linea aspera internally.  
**Situation.** *Anteriorly* it is covered by fascia, by the sartorius and femoral vessels; *posteriorly* it lies upon the adductor brevis and magnus.  
**Use.** To adduce the thigh, and carries it outwards in rotation.

- Inserted** Both muscles are inserted into the fossa of the trochanter major.
- Use.** To rotate the thigh outwards.

## OBTURATOR INTERNUS.

(*Sub-pubo-trochanterus internus*. Chauss.)  
 (*Intra-pelvio-trochanterien*. Dumas.)

- Arises** From the inner border of the obturator foramen and inner surface of the obturator ligament.
- Inserted** Into the fossa of the trochanter major.
- Situation.** Within the pelvis it is placed between the obturator ligament, and levator ani; anteriorly its tendon lies between the gemelli; *posteriorly* it is covered by the glutæus maximus, and great sciatic nerve and ischiatic vessels.
- Use.** To rotate the thigh outwards.

## OBTURATOR EXTERNUS

(*Sub-pubo-trochanterus externus*. Chauss.)  
 (*Extra-pelvio-pubi-trochanterien*. Dumas.)

- Arises** From the outer margin of the obturator foramen and outer surface of the obturator ligament, its tendon winds around neck of the femur, adhering to the capsular ligament.
- Inserted** Into the fossa of the trochanter major.
- Situation.** Its origin is covered by the pectinalis; it is upon the obturator ligament; *posteriorly* it is covered by the quadratus femoris.
- Use.** To rotate the thigh outwards.

## QUADRATUS FEMORIS.

(*Ischio-trachanterus*. CHASS.)

*Tuber ischio-trachanterica*. Dumas.)

From the tuberosity of the ischium.

Into the linea quadrata.

2. It is covered by the *glutæus maximus*, *semi-membranosus*, *adductor magnus*, great sciatic nerve, and ischiatic vessels; *anteriorly* it lies upon the *obturator externus*, tendons of the *psaos magnus*, and *iliacus internus*; upon the capsule of the ilio femoral articulation.

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*situated on the external and anterior part of the Thigh.*

muscles of the thigh are covered by a strong, *ascia*, the *fascia lata*.\* It arises from the bones

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Examining the fascia lata it will be found to arise by two portions—the outer portion from Poupart's ligament, the pubic or inner portion from the iliac foramen. The origin of the iliac portion presents the appearance of a process; this was first accurately described by Allen Burns, and by him the *falciform process* of the fascia lata; the pubic portion covers the triceps, and pectineus muscles, and dips down beneath the iliac vessels, and is united with the iliac portion beneath the vein major, where that vein joins the femoral. The oval aperture between the two portions is termed the *saphenous opening*, and is occupied by the sheath of the femoral sheath: it is placed on the inner and fore-part of the thigh, beneath Poupart's ligament. *Femoral sheath*.—The covering between the peritoneum and transversalis abdominis (fascia alia) passes underneath Poupart's ligament to form the femoral sheath, and forms the front of the femoral sheath: fascia propria of each muscle forms the strong fascia covering the iliacus internus, passes over the iliac vessels, and forms the posterior part of the sheath; these unite at the neck, and constitute the *ovoid portion*. The sheath is of a funnel shape, and continues on the outer side the femoral sheath, and the vein which is separated from the artery by a distinct septum. Between the vein and inner border of the sheath, we have a space called the *crural space* or *crural aperture*. The *crural ring* is above Poupart's ligament, below the iliac vessels, and the *crural vein* on the inner of Glisson's ligaments. This space is a circular membrane (fascia cruralis), through which the vessels of the iliac vessels enter the vein, by a small opening. According to Sir E. Cooper this has a small portion of the iliac vessels. I have seen enter his opening, and continuing to enter the vein through the crural opening of the fascia lata, the femoral sheath described under the name of *crural space* is said. The covering of the femoral sheath is the *crural space*, and, lastly, the *crural space* is the *crural space*.



of the pelvis, from Poupart's and Gimbernat's ligament, is spread over the whole of the thigh; strong and dense on the outer part, more delicate on the anterior and inner part. The *anterior* surface is covered by the superficial fascia, saphena major vein, by small branches from the lumbar and anterior crural nerves, by a number of lymphatic vessels, and superiorly by a chain of lymphatic glands; *superiorly* it gives a covering to the glutæus maximus, and medius, adheres to the sacrum and os coccygis; *inferiorly* it is continuous with the fascia of the leg; *internally* it dips down between the triceps and vastus internus and firmly adheres to the linea aspera; *externally* between the vastus externus, and glutæus maximus above, between the vastus externus, and biceps below; thus the muscles of the anterior region are separated from those of the posterior region.

*Use.* To bend the muscles together, and to prevent their starting during action, thus increasing their power.

### TENSOR VAGINÆ FEMORIS.

(*Ilio-femoralis*. Chauss.)

(*Ilio-aponeurosi-femoral*. Dumas.)

*Arises* From the anterior superior spinous process of the ilium.

*Inserted* Into the fascia lata, below the trochanter major.

*Situation.* *Externally* it is covered by the fascia lata; *posteriorly* it lies upon a portion of the rectus and vastus externus; *anteriorly* it is connected with the sartorius at its origin; *posteriorly* with the glutæus medius.

*Use.* To tighten the fascia lata, to abduce the thigh.

- Inserted** Into the inner border of the patella.  
**Situation.** *Anteriorly* it is covered by fascia, sartorius, and femoral vessels; it lies upon the psoas magnus, pectinalis and adductor magnus; the outer border overlaps the cruræus.  
**Use.** To assist in extending the leg.
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*Muscles situated on the inner and posterior part of the thigh.*

### PECTINALIS.

(*Pubo-femoralis*. Chauss. and Dumas.)

- Arises** From the body of the pubes.  
**Inserted** Into the linea aspera, below the trochanter minor.  
**Situation.** *Anteriorly* it is covered by the fascia lata, deep inguinal glands, and femoral vessels; *posteriorly* it lies upon the os pubis capsule of ilio-femoral articulation, upon the obturator externus, adductor brevis; upon the obturator vessels and nerves.  
**Use.** To raise the thigh upwards and inwards.

### TRICEPS ADDUCTOR LONGUS.

(*Pubo-femoralis*. Chauss. *Spini-pubio-femoral*. Dumas.)

- Arises** From the os pubis, between its tubercle and symphysis.  
**Inserted** Into the middle third of the linea aspera internally.  
**Situation.** *Anteriorly* it is covered by fascia, by the sartorius and femoral vessels; *posteriorly* it lies upon the adductor brevis and magnus.  
**Use.** To adduce the thigh, and carries it outwards in rotation.

## CRURÆUS.

(*Tri-femoro-retularis.* Chauss.)  
 (*Tri-femoro-tibi-rotulien.* Dumas.)

- Arises** From the fore-part of the os femoris between the two trochanters, from the convex surface of the body.
- Inserted** Into the superior border of the the patella, below the rectus.
- Situation.** *Anteriorly* it is covered by the iliacus internus, and rectus, from which it is separated by the external circumflex vessels, and descending branches; *posteriorly* it lies upon the os femoris, and synovial capsule of the femoro-tibial articulation; *externally* and *internally* its fibres are intimately united with those of the vasti.
- Use.** To assist in extending the leg.

## VASTUS EXTERNUS.

(*Tri-femoro-rotularis.* Chauss.)  
 (*Tri-femoro-tibi-rotulien.* Dumas.)

- Arises** From the root of the trochanter major, from the external border of the linea aspera, and ridge leading to the outer condyle.
- Inserted** Into the outer border of the patella.
- Situation.** *Anteriorly* it is covered by the tendon of the glutæus maximus, fascia lata, tensor vaginae femoris, by the short head of the biceps; the inner border overlaps the cruræus.
- Use.** To assist in extending the leg.

## VASTUS INTERNUS.

(*Tri-femoro-rotularis.* Chauss.)  
 (*Tri-femoro-tibi-rotulien.* Dumas.)

- Arises** From the root of the trochanter minor, from the inner border of the linea aspera, and ridge leading to the inner condyle.

*Inserted* Into the inner border of the patella.

*Situation.* *Anteriorly* it is covered by fascia, sartorius, and femoral vessels; it lies upon the psoas magnus, pectinalis and adductor magnus; the outer border overlaps the cruræus.

*Use.* To assist in extending the leg.

*Muscles situated on the inner and posterior part of the thigh.*

### PECTINALIS.

(*Pubo-femoralis*. Chauss. and Dumas.)

*Arises* From the body of the pubes.

*Inserted* Into the linea aspera, below the trochanter minor.

*Situation.* *Anteriorly* it is covered by the fascia lata, deep inguinal glands, and femoral vessels; *posteriorly* it lies upon the os pubis capsule of ilio-femoral articulation, upon the obturator externus, adductor brevis; upon the obturator vessels and nerves.

*Use.* To raise the thigh upwards and inwards.

### TRICEPS ADDUCTOR LONGUS.

(*Pubo-femoralis*. Chauss. *Spini-pubio-femoral*. Dumas.)

*Arises* From the os pubis, between its tubercle and symphysis.

*Inserted* Into the middle third of the linea aspera internally.

*Situation.* *Anteriorly* it is covered by fascia, by the sartorius and femoral vessels; *posteriorly* it lies upon the adductor brevis and magnus.

*Use.* To adduce the thigh, and carries it outwards in rotation.

## ADDUCTOR BREVIS.

(*Sub-pubo-femoralis*. Chauss.)

(*Sous-pubio-femoral*. Dumas.)

- Arises** From the ramus of the os pubis.
- Inserted** Into the linea aspera below the trochanter minor.
- Situation.** *Anteriorly* it is covered by the pectinalis, and adductor longus; *posteriorly* it lies upon the adductor magnus.
- Use.** To assist the action of the preceding muscle.

## ADDUCTOR MAGNUS.

(*Ischio-femoralis*. Chauss. *Ischio-pubi-femoral*. Dumas.)

- Arises** From the ramus of the os pubis and ischium, also from its tuberosity.
- Inserted** Into the inner margin of the linea aspera, into the ridge leading to the inner condyle, and into the inner condyle itself by a rounded tendon.
- Situation.** *Anteriorly* it is covered by the pectinalis gracialis, adductor longus and brevis, by the sartorius and femoral vessels; *posteriorly* it lies upon the biceps, semimembranosus, semitendinosus, glutæus maximus, great sciatic nerve: *the external margin* is attached to the linea aspera; *the internal border* is covered by the fascia lata. About the upper part of the lower third of the thigh, there is a large tendinous opening between the adductor magnus and vastus internus, for the femoral vessels to pass backwards into the popliteal space.
- Use.** To adduce the thigh, to rotate it outwards.

## GRACILIS.

(*Pubo-præ-tibialis*. Chauss.)  
 (*Sous-pubis-creti-tibial*. Dumas.)

- Arises* From the lower part of the symphysis pubis.  
*Inserted* Into the tibia, below the sartorius.  
*Situation.* *Internally* it is covered by the fascia lata; *inferiorly* by the sartorius; it lies upon the adductors, semi-membranosus, internal lateral, and capsular ligaments of the knee joint.  
*Use.* To assist in the flexion of the knee.

The last muscle situated internally, namely, the obturator externus, has been already described.

*Muscles at the back part of the Thigh.*

## BICEPS.

(*Ischio-femora-peroneus*. Chauss. & Dumas.)

- Arises* By two heads—the long head from the tuberosity of the ischium in common with the semi-tendinosus; the short head from the linea alba, below the insertion of the glutæus maximus.  
*Inserted* Into the back part of the head of the fibula.  
*Situation.* *Posteriorly* it is covered by the glutæus maximus and fascia lata; *anteriorly* it lies against the semi-membranosus, great sciatic nerve, adductor magnus, external lateral ligament, external circumflex vessels, external head of the gastrocnemius externus.  
*Use.* To bend the knee.

## SEMI-TENDINOSUS

*(Ischio-præ-tibialis. Chauss.)**(Ischio-creti-tibial. Dumas.)*

- Arises** From the tuberosity of the ischium.  
**Inserted** Into the anterior part of the tibia, below the gracilis and sartorius.  
**Situation.** *Posteriorly* it is covered by the fascia lata; *anteriorly* it lies upon the semi-membranosus.  
**Use** To assist in bending the knee.

## SEMI-MEMBRANOSUS.

*(Ischio-sub-tibialis. Chauss.)**(Ischio-popliti-tibial. Dumas.)*

- Arises** From the tuberosity of the ischium.  
**Inserted** Into the outer condyle, forming the posterior or oblique ligament of the femoro-tibial articulation, into the back part of the tibia, and also into the head, *anteriorly* and *internally*.  
**Situation.** *Posteriorly* it is covered by the biceps, semi-tendinosus, and fascia lata: *anteriorly* it lies against the quadratus femoris, adductor magnus, inner head of gastrocnemius externus, internal lateral ligament, and capsule of the femoro-tibial articulation.  
**Use.** To assist in bending the knee.

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*Muscles of the fore-part of the Leg.*

These muscles are covered by a strong fascia, precisely similar to that covering the fore-arm. This fascia is in a great measure derived from the tendons of the rectus, vasti, and cruræus; it adheres closely to the tibia and fibula, and being strengthened by some cross fibres towards the ankle joint, it receives the name of ligamentum tarsi annulare. This band proceeds from the outer part

of the external malleolus, across the instep, to the upper part of the inner malleolus. This ligament seems designed for the purpose of binding down the several tendons of the muscles, extending the toes, and prevents their starting. This fascia sends processes between the muscles, forming the inter-muscular ligaments, and gives origin to many muscular fibres. The *outer surface* is covered by the integuments, venæ saphenæ and branches, of absorbent vessels, and cutaneous nerves. On removing the fascia, we expose three muscles at the upper part, namely—tibialis anticus, extensor digitorum longus, peroneus longus: at the middle third we expose, tibialis anticus, extensor proprius pollicis, extensor longus, peroneus tertius, peroneus longus, peroneus brevis.

### TIBIALIS ANTICUS.

(*Tibio-super-tarseus*. Chauss.)

(*Tibio-sus-metatarsien*. Dumas.)

- Arises** From the superior two thirds of the tibia.  
**Inserted** Into the cunëiforme internum, and metatarsal bone of the great toe.  
**Situation.** *Anteriorly* it is covered by fascia; *posteriorly* it lies upon the interosseous ligament; the *external margin* is in apposition with the extensor digitorum longus above, and the extensor proprius pollicis below, and with the anterior tibial vessels and nerves.  
**Use.** To bend the foot by drawing it upwards and at the same time to turn the toes inwards.

### EXTENSOR LONGUS DIGITORUM PEDIS.

(*Peroneo-super-unguialis*. Chauss.)

(*Peroneo-tibi-sus-phalangeitien commun*. Dumas.)

- Arises** From the outer part of the head of the tibia, from the head of the fibula, and from about three fourths of this bone, and from the interosseous ligament.  
**Inserted** Into the root of the first phalanx of the four outer toes, and into the upper surface of the four last and outer phalanges.



**Situation.** *Anteriorly* it is covered by fascia; *posteriorly* it lies upon the interosseous ligament and fibula, upon the tibio-tarsal articulation, upon the dorsum of the foot, and extensor brevis: *externally* it is in apposition with the peroneus longus, brevis, and tertius; *internally* with the tibialis anticus above, and extensor proprius pollicis below.

**Use.** To extend the toes, to flex the ankle.

### EXTENSOR PROPRIUS POLLICIS PEDIS.

(*Peroneo-super-unguialis*. Chauss.)

(*Peroneo-sus-phalangiæ du pouce*. Dumas.)

**Arises** Some way below the head and anterior part of the fibula, and continues its origin as far as the inner mæolus.

**Inserted** Into the base of the first and second phalanges of the great toe.

**Situation.** *Anteriorly* it is covered by the fascia and extensor longus digitorum pedis; *posteriorly* it lies upon the fibula, the external surface of the tibia, the anterior tibial vessels, the tibio-tarsal articulation, the dorsum of the foot; *internally* it is in apposition with the tibialis anticus, and anterior tibial vessels and nerves, and it has the extensor digitorum longus to its *outer side*, and on the dorsum of the foot; the *anterior* tibial artery is placed to the outer side of its tendon.

**Use.** To extend the great toe and to assist in flexing the ankle.

### PERONEUS TERTIUS.

(*Peroneo-metatarsæus parvus*. Chauss. et Dumas.)

Is nothing more than a fibular slip of the extensor longus.

**Inserted** Into the metatarsal bone of the little toe.

*Use.* To extend the little toe, to flex the ankle, to abduct the foot.

### PERONEUS LONGUS.

(*Peroneo-tarsus*. Chauss.)  
(*Tili-perones-tarsien*. Dumas.)

*Arises* From the upper part of the tibia, from the head of the fibula, and from the upper half of its external angle.

*Inserted* Into the cunëiforme internum and metatarsal bone of the great toe.

*Situation.* *Externally* it is covered by the fascia; *internally* it lies upon the fibula and peroneus brevis; *anteriorly* it is in apposition with the extensor longus digitorum pedis; *posteriorly* with the fibres of the soleus superiorly, and flexor longus pollicis inferiorly.

*Use.* To turn the foot outwards, to extend the foot.

### PERONEUS BREVIS.

(*Peroneo-metatarsus magnus*. Chauss. & Dumas.)

*Arises* From the lower half of the fibula.

*Inserted* Into the os cuboïdeum and base of the metatarsal bone of the little toe.

*Situation.* *Externally* it is covered by the peroneus longus, and fascia; *internally* it lies upon the fibula.

*Use.* To assist in extending the ankle.

### *Muscles of the back part of the Leg.*

The tibial aponeurosis is not so thick as on the anterior region, it divides into two layers, a deep and superficial. The superficial layer invests the posterior surface of the gastrocnemii and tendon Achilles, and is eventually lost in the cellular tissue inferiorly. The

deep layer passes in front of the tendo Achilles, and covers the flexor longus pollicis, tibialis posticus, and flexor digitorum pedis.

## GASTROCNEMUIS EXTERNUS.

(*Bi-femoro-calcaneus*. Chauss. and Dumas.)

- Arises** By two heads; the first head from the upper and back part of the internal condyle, the second head from the upper and back part of the outer condyle.
- Inserted** It terminates in a broad tendon (tendo Achilles) which uniting with that of the solæus, is inserted into the lower and back part of the os calcis.
- Situation.** It is covered *posteriorly* by fascia, it lies upon the femoro-tibial articulation, the popliteus, plantaris, and solæus muscles; upon the popliteal vessels and branches upon the tibial and fibular nerves.
- Use.** Powerfully to extend the foot by raising the os calcis.

## PLANTARIS.

(*Femori-calcaneus*. Chauss. and Dumas.)

- Arises** From the outer condyle and oblique ligament of the knee joint.
- Inserted** Into the posterior part of the os calcis.
- Situation.** *Posteriorly* it is covered by the gastrocnemius externus, and tendo Achilles; *anteriorly* it lies upon the femoro-tibial articulation, upon the popliteus and solæus muscle, upon the popliteal vessels and nerves.
- Use.** To assist in extending the heel.

**GASTROCNEMIUS INTERNUS, OR SOLÆUS.***(Tibio-calcaneous. Chauss.)**(Tibio-peronei-calcaneus. Dumas.)*

- Arises** By two heads. The first head from the posterior part of the head of the fibula, from the outer angle of that bone. The second head from the oblique line on the posterior surface of the tibia.
- Inserted** With the tendon of the gastrocnemius externus into the posterior part of the os calcis.
- Situation.** It is covered by the gastrocnemius externus, and plantaris; it lies upon the fibula tibia, superiorly, upon the deep fascia and deep layer of muscles; popliteal, posterior tibial, and fibular vessels, and nerves.
- Use.** Powerful to extend the foot by raising the heel.
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*Deep Layer of Muscles at the posterior part of the Leg.***POPLITÆUS.***(Poplito-tibialis. Chauss.)**(Femoro-popliti-tibial. Dumas.)*

- Arises** From the outer condyle, it is also connected to the external semilunar cartilage.
- Inserted** Into the posterior surface of the tibia.
- Situation.** It is covered by fascia, by the external lateral ligament and tendon of the biceps; by the gastrocnemius externus and plantaris; by the popliteal vessels and nerves; it lies upon the external condyle, external semilunar cartilage, fibular articulation, posterior surface of the tibia, and upon the tibialis posticus muscle.
- Use.** To bend the leg, and when bent, to roll it inwards.

## FLEXOR LONGUS DIGITORUM PEDIS PROFUNDUS PERFORANS.

(*Tibio-sub-ungualis. Tibio-phalangeal commun.*  
Chauss. & Dumas.)

- Arises** From the back part of the tibia, below the solæus muscle.
- Inserted** Into the extreme phalanges of the four outer toes.
- Situation.** *Posteriorly* it is covered by the solæus, by fascia, by the posterior tibial vessels and nerves, by the annular ligament; in the sole of the foot it has, *above*, the deep muscles; *inferiorly*, the flexor longus pollicis pedis, flexor brevis et accessorius, and plantar nerve: the *external border* is in apposition with tibialis posticus *superiorly*, and with the flexor longus pollicis.
- Use.** To flex the toes and extend the foot.

## FLEXOR LONGUS POLLICIS.

(*Peroneo-phalangeus. Chauss.*)  
(*Peroneo-phalangeus. Dumas.*)

- Arises** From the posterior part of the fibula.
- Inserted** Into the extreme phalanx of the great toe.
- Situation.** It is covered *posteriorly* by the solæus, and by the deep fascia and annular ligament: it lies upon the fibula, tibialis posticus, interosseous ligament, upon the posterior surface of the tibia, and tibio-tarsal articulation.
- Use.** To bend the great toe, and to assist in extending the foot.

## TIBIALIS POSTICUS.

(*Tibio-sub-tarseus. Chauss. & Dumas.*)

- Arises** From the anterior part of the tibia, by a few fibres passing through the upper opening

in the interosseous ligament, from the back part of the tibia, and from the back part of the fibula.

*Inserted* Into the os naviculare, cuneiforme externum, et medium, cuboideum, and second and third metacarpal bones.

*Situation.* It is covered *posteriorly* by fascia, by the flexor digitorum, and flexor longus pollicis: it lies upon the tibia, fibula, and interosseous ligament.

*Use.* To extend the foot and turn the foot inwards.

### *Muscle of the Foot.*

There is but one muscle on the dorsum of the Foot.

### EXTENSOR BREVIS DIGITORUM PEDIS.

(*Calcaneo-super-unguialis*. Chauss. et Dumas.)

*Arises* From the upper and fore-part of the os calcis.

*Inserted* Into the extreme phalanges of the four inner toes.

*Situation.* It is covered by the extensor longus digitorum pedis and peroneus brevis; it lies upon the dorsal interossei.

*Use.* To assist in extending the toes and flexing the foot.

### *Muscles on the plantar surface of the Foot.*

On removing the integuments and a quantity of granulated fat, you first expose the plantar aponeurosis. It is of triangular shape, and extends from the posterior part of the os calcis to the heads of the metatarsal bones. It consists of a central portion, strong, dense, and resisting, and two lateral portions, which are thin and invest the muscles of the great and little toes. The under surface is covered by the integuments, cel-

lular and adipose tissue; *the upper surface* is in contact with the abductor pollicis, flexor brevis, and abductor minimi digiti; it is also in contact with the flexor brevis minimi digiti pedis, plantar vessels and nerves; *anteriorly* it divides into five slips to allow the passage of the flexor tendons of the toes.

### ABDUCTOR POLLICIS PEDIS.

(*Calco-sub-phalangeus pollicis*. Chauss. and Dumas.)

*Arises* From the inner side of the under surface of the os calcis.

*Inserted* Into the os sesamöideum internum.

*Situation.* The *under* surface is covered by the plantar aponeurosis, the *upper* surface is partly covered by the flexor brevis pollicis, by the flexor accessorius, by the plantar vessels and nerves.

*Use.* To abduce the great toe.

### FLEXOR BREVIS DIGITORUM PEDIS SUB- LIMIS PERFORATUS.

(*Calcaneo-sub-unguialis*. Chauss. and Dumas.)

*Arises* From the inner and inferior surface of the os calcis.

*Inserted* Into the second phalanges of the four outer toes.

*Situation.* *Inferiorly* it lies upon the plantar aponeurosis, *above* it is in contact with the flexor accessorius, with the tendons of the flexor longus, lumbricales, and plantar vessels and nerves.

*Use.* To assist in flexing the toes, and also in extending the foot.

**ABDUCTOR MINIMI DIGITI.**

(*Calco-sub-phalangeus minimi digiti.*  
 Chauss. and Dumas.)

- Arises** From the os calcis and metatarsal bone of the little toe.
- Inserted** Into the first phalanx of the little toe.
- Situation.** It is covered by the plantar aponeurosis and integuments; above it is in contact with the flexor accessorius, the tendon of the peroneus longus and flexor brevis minimi digiti.
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The second layer of muscles consist of the flexor accessorius and lumbricales; the tendons of the flexor longus digitorum pedis profundus, and flexor longus pollicis will be exposed.

**FLEXOR ACCESSORIUS, OR MASSA CARNEA JACOBI SYLVII.**

- Arises** From the under surface of the os calcis.
- Inserted** Into the outer margin of the tendon of the flexor longus digit pedis.
- Situation.** *Below* it lies upon the flexor brevis digitorum pedis, abductor pollicis, abductor minimi digiti, and plantar vessels and nerves; *above* it is in contact with the os calcis, and the adductor pollicis.
- Use.** To assist in flexing the toes.

**LUMBRICALES PEDIS.**

(*Planto-sub-phalangei.* Chauss.)  
 (*Planto-tendino-phalangiens.* Dumas.)

- Arise.** Are four thin slips of muscles connected to the tendons of the flexor profundus.
- Inserted** Into the inside of the first joint of the four outer toes.



**Situation.** *Below* they lie upon the *flexor sublimis*; *above* they are in apposition with the *interossei*, and *adductor pollicis pedis*.

**Use.** These muscles encrease the extent of the flexion of the toes.

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The third layer consists of the *flexor brevis pollicis pedis*, *adductor pollicis*, *transversus pedis*, and *flexor minimi digiti pedis*.

### FLEXOR BREVIS POLLICIS PEDIS.

(*Tarso-sub-phalangeus pollicis*. Chauss. and Dumas.)

**Arises** From the *os calcis* and *os cunëiforme externum*.

**Inserted** Into the root of the first phalanx of the great toe.

**Situation.** It lies upon the tendon of the *flexor longus pollicis*; above it is placed the tendon of the *peronæus longus*, and metatarsal bone of the great toe.

**Use.** To flex the great toe.

### ADDUCTOR POLLICIS PEDIS.

(*Metatarso-sub-phalangeus pollicis*. Chauss.)

(*Tarso-metatarsi-phalangien du pouce*. Dumas.)

**Arises** From the *os calcis*, *cuböideum* and *cunëiforme externum*, and root of the metatarsal bone of the second toe.

**Inserted** Into the *os sesamöideum externum*, and root of the metatarsal bone of the great toe.

**Situation.** Its *inferior surface* is in apposition with the *flexor profundus* and three first *lumbricales*, *flexor accessorius*, and *plantar aponeurosis*; *above* it has the tendon of the *peronæus longus*; the *external border* is coated by the external plantar vessels.

**Use.** To adduce the great toe.

## TRANSVERSALIS POLLICIS, OR TRANS- VERSALIS PEDIS.

(*Metatarso-sub-phalangeus*. Chauss.)  
(*Metatarso-phalangien du pouce*. Dumas.)

- Arises** From the os sesamöideum externum.  
**Inserted** Into the head of the metatarsal bone of the little toe.  
**Situation.** *Inferiorly* it lies upon the flexor tendons lubricales and digital vessels and nerves; *above* it is in contact with the interossei.  
**Use.** To contract the foot, the outer and inner toes being drawn towards each other.

## FLEXOR MINIMI DIGITI PEDIS.

- Arises** From the os cuböideum and metatarsal bone of the little toe.  
**Inserted** Into the root of the first phalanx of the little toe.  
**Situation.** *Inferiorly* it is covered by the abductor minimi digiti pedis and plantar aponeurosis: *above* it has the external interosseal.  
**Use.** To bend the first phalanx of the little toe.

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The fourth layer consists of the interossei, and the tendon of the peronæus longus will be exposed. There are two strata of interossei muscles, viz. three *interossei interni*, placed in the sole of the foot, which move the three outer toes toward each other and are described as the adductor medii, adductor quarti, et adductor minimi digiti. There are four interossei externi, which are larger than the internal and bicipites, which separate the toes from each other: these have been termed abductores digiti secundi, abductor digiti medii, abductor digiti quarti. The great toe has none. These muscles fill up the interstices between the metatarsal bones.

*Muscles of the Perinæum.*

On removing the integuments will be exposed a strong, dense fascia (*fascia superficialis perinæi*); it is firmly connected to the *ossa ischia* and *os pubis*, and also to the tendinous aponeurosis of the thigh; *above* it is loosely connected with the cellular tissue of the scrotum. The muscles attached to the perinæum are, on either side, the erector penis, accelerator urinæ, transversus perinæi, transversalis perinæi alter, levator ani, coccygeus, and a single muscle, the sphincter ani.

## ERECTOR PENIS,

(*Ischio-urethralis*. Chauss. *Ischio caverneux*. Dumas.)

*Arises* From the inner border of the *tuber ischii*; the fibres are spread over the *crus penis*.

*Inserted* Into the commencement of the *corpus cavernosum*.

*Situation.* Its *inner surface* corresponds with the transversus perinæi, accelerator urinæ, from which it is separated by the perineal artery.

*Use.* To compress the *crus penis*, and to erect the penis, and also to depress it.

## ACCELERATOR URINÆ.

(*Bulbo-urethralis*. Chauss.)

(*Bulbo-syndesmo-caverneux*. Dumas.)

*Arises* From the commencement of the *corpus cavernosum penis*, being connected with the insertion of the erector penis.

*Inserted* Into a line in the middle of the bulb where it joins with its fellow, and into the centre of the perinæum.

*Situation.* Inferiorly it is covered by fascia; superiorly it lies upon the *crus penis*, *corpus spongiosum*, and bulb of the urethra.

*Use.* To expel the urine or semen, by compressing the bulb.

## TRANSVERSUS PERINÆI.

(*Ischio-perinealis*. Chauss.)  
 (*Ischio-pubi-prostatique*. Dumas.)

- Arises** From the inner side of the tuberosity of the ischium.
- Inserted** Into the centre of the perinæum, where it is connected with its fellow, it is also connected to the fibres of the accelerator urinæ and sphincter ani.
- Situation.** *Anteriorly* it is covered by the erector penis, by some of the fibres of the sphincter ani, and by the superficial perinæal fascia: *posteriorly* it lies upon the levator ani, from which it is separated by cellular tissue; and *externally* by the deep branch of the internal pudic artery.
- Use.** To dilate the bulb and draw the perinæum, and extremity of the anus a little outwards and backwards.

## TRANSVERSUS PERINÆI ALTER.

On each side of the perinæum is a triangular space, the base formed by the transversus perinæi, the inner border by the bulb of the urethra, the outer border by the crus penis, the transversus perinæi occupies this triangular space.

- Arises** From the ramus of the ischium.
- Inserted** Into the side of the bulb.
- Use.** To dilate the bulb.

## LEVATOR ANI

(*Sub-pubalis-coccygeus*. Chauss.)  
 (*Pubio coccygien annularis*. Dumas.)

- Arises** From within the pelvis, from the fascia covering the obturator internus muscle from the spine of the ischium.

*Inserted* Into the extremity and os coccygis. It sends off fibres covering the prostate gland, vesiculæ seminales, neck of the bladder, sides of the rectum, also a slip around the membranous portion of the urethra, forming with its fellow a loop through which the urethra passes (compressor urethræ of Wilson.)

*Situation.* Externally it corresponds to the obturator internus; internally it lies upon the bladder, prostate gland, and vesiculæ seminales and rectum, in the female it is connected with the vagina.

*Use.* To draw the rectum upwards to assist in the expulsion of the secretions of the prostate gland, vesiculæ seminales and contents of the bladder. In the female it will lessen the diameter of the vagina.

### COC CYGEUS.

(*Ischio-coccygeus*. Chauss.)

*Arises* From the spine of the ischium.

*Inserted* Into the whole edge of the os coccygis.

*Situation.* Posteriorly it is covered by the sacro sciatic ligaments; anteriorly it rests against the rectum.

*Use.* To retain the os coccygis in its situation.

### SPHINCTER ANI.

(*Anno-coccygeus*. Chauss.)

(*Coccygio-cutanè-sphincter*. Dumas.)

*Arises* From the extremity of the os coccygis, the fibres pass around the extremity of the rectum and are

*Inserted* Into the centre of the perinæum.

*Situation.* Its fibres anteriorly are united with those of the accelerator urinæ and transversalis perinæi.

*Use.* To close the opening into the rectum, to draw down the urethra, thus assisting in the expulsion of the urine and semen. The

antagonists of this muscle are the longitudinal fibres of the rectum and the abdominal muscles.

### ERECTOR CLITORIDIS.

*Arises* In the female from the ramus of the ischium.  
*Inserted* Into the crus and body of the clitoris.  
*Use.* To compress the crus clitoridis.

### SPHINCTER VAGINÆ.

*Arises* From the sphincter ani, from the sides of the vagina; the fibres surround the vagina, and are eventually  
*Inserted* Into the corpora clitoridis.  
*Use.* To contract the orifice of the vagina.

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### DIAPHRAGM.

The diaphragm forms the septum between the thorax and abdomen: in the relax state it is concave *below*, convex *above*, ascending in the chest as high as the fourth rib: when in action, it is drawn nearly to a straight plane; *inferiorly* it is covered by the peritoneum; *superiorly* by the pleura and pericardium. It consists of a middle tendon and a greater and smaller muscle: the central tendon is somewhat of a cordiform shape; it is formed of three portions, and hence it has been compared to a trefoil leaf—the central portion is the largest, the other portions are placed laterally of which the right is the largest. The tendon consists of coarse, strong fibres interlacing each other in various directions. In this tendon on the right side is a *triangular opening* for the vena cava ascendens; sometimes we have small openings for the diaphragmatic veins and superior hepatic veins. The greater muscle of the diaphragm arises on each side from the cartilago ensiformis, from the cartilages of the six inferior ribs, and from the ligamentum arcuatum: the fibres radiate towards the centre—those from the lower ribs ascend, those from the ensi-

form cartilage pass backwards, those from the sides pass directly inwards: these fibres are all inserted into the central tendon. *The smaller muscle* is the portion affixed to the lumbar vertebræ. It arises by four distinct slips on each side from the bodies of the second, third, and fourth lumbar vertebræ: these four processes unite and form the crura or pillars of the diaphragm: on tracing the crura upwards, they are found to approach each other, and then to partially decussate in front of the spine; they separate and again unite, and thus form a second opening; the fibres are then inserted into the central tendon.

Through the first opening between the cura which is tendinous, pass the aorta, thoracic duct, and branches of veins, to form the vena azygos; through the second opening, which is muscular, the œsophagus and eight pair of nerves. On the sides between the muscular fibres are openings for the passage of the splanchnic nerves which form a communication between the thoracic ganglia of the great sympathetic nerve and those of the abdomen. *Uses of the diaphragm.*—It is the great muscle of respiration, it is active or contracted during inspiration, passive or relaxed during expiration. During inspiration the lateral portions descend, the central tendon remaining fixed because the heart rests upon it; by this means the chest is rendered deeper. In expiration the diaphragm is forced up into the chest by the action of the abdominal muscles contracting upon the viscera, and thus the chest is diminished in all its dimensions.

## **PHYSIOLOGICAL ARRANGEMENT OF THE MUSCLES.**

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### **MUSCLES OF THE CRANIUM.**

The integuments of the fore-head and occiput are thrown into transverse rugæ by one pair of muscles.  
Occipito-frontalis.

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### **MUSCLES OF THE EYE-BROWS.**

The eye-brows are drawn towards each other, and the integuments of the forehead are thrown into longitudinal folds by one pair of muscles.  
Corrugator supercilii.

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### **MUSCLES OF THE EYE-LIDS.**

There belong to each eye-lid two pairs of muscles, one closes the palpebræ, the other raises the upper lid.  
Orbicularis palpebrarum    Levator palpebræ superioris.

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### **MUSCLES OF THE BALL OF THE EYE.**

Six muscles are destined for the motions of the ball of the eye, and their use is manifest from their names.



Levator oculi  
Adductor oculi  
Obliquus superior

Depressor oculi  
Abductor oculi  
Obliquus inferior

## MUSCLES OF THE EAR.

Three muscles are destined to the motion of the auricle, and their action will be manifest from their description.

Attolens aurem

Retrahens aurem

Detrahens aurem.

Five pairs are connected with the margins of the concha, and can, with difficulty, be demonstrated, except in some of the lower animals. Their use is to draw inwards, outwards, or towards each other, different parts entering into the formation of the concha so as to collect the pulses of sound.

Tragicus

Antitragicus

Helicus major

Helicus minor

Transversus auriculæ

The muscles of the internal Ear are four in number.

Laxator tympani, tensor tympani, relax the membrana tympani, malleus externus, stapedius—render the membrana tympani tense.

## MUSCLES OF THE NOSE.

To the nose four pair of muscles are proper.

Levator labii superioris alæque nasi, compressor naris—dilate the nostrils.

Depressor alæ nasi—depresses the alæ of the nose and contracts the nostrils.

Pyramidalis nasi—draws up the integuments of the nose.

## MUSCLES OF THE CHEEKS AND LIPS.

There are ten pair of muscles proper to the Lips and Cheeks:

Levator labii superioris alæque nasi, levator anguli oris, zygomaticus major, zygomaticus minor—*raise* the upper lip, or carry it obliquely to one side.

Depressor labii superioris alæque nasi—*depresses* the upper lip and alæ of the nose.

Triangularis oris, quadratus genæ, platysma myöides—*draw down* the lower lip.

Levator labii inferioris—*raises* the lower lip.

Buccinator—*contracts* the cavity of the mouth, or draws the angle of the mouth backwards.

Orbicularis—*closes* the mouth, assisted by the muscles acting upon the lower jaw.

The mouth is *opened* by the elevators of the upper lip and depressors of the lower lip, and muscles depressing the lower jaw.

## MUSCLES OF THE LOWER JAW.

The lower Jaw has five pair of muscles.

The lower jaw is *raised* by the temporal, masseter, and internal pterygoid; carried *forwards* by the external pterygoid and anterior fibres of the masseter; moved *backwards* by the temporal and posterior fibres of the masseter; moved *laterally* by the pterygoideus externus, and internus of one side. The lower jaw is *depressed* by the digastrici, mylo-hyöidei, genio-hyöidei, genio-hyo-glossi, and platysma myöides. The temporal masseter and two pterygoid muscles are especially employed in the process of mastication. The two former are destined more especially to act upon animal substances—hence large in carnivorous animals; the latter to break down vegetable matter—hence strongly developed in graminivorous: these muscles are equally developed in man.

## MUSCLES OF THE OS HYÖIDES.

The muscles of the os hyöides are five pairs.

Mylo hyöideus, genio-hyöideus—*raise* the os hyöides, consequently the larynx and pharynx, and *depress* the lower jaw.

Sterno-hyöideus—carries the os hyöides *downwards*.

Sylo-hyöideus—pulls the os hyöides *upwards*.

Omo-hyöideus—carries the os hyöides obliquely *downwards*.

## MUSCLES OF THE TONGUE.

To the Tongue are destined four pairs of muscles.

Hyo-glossus—*depresses* the edge of the tongue.

Genio-hyo-glossus—*raises* the tongue and draws it forwards.

Stylo-glossus—*draws* the tongue backwards.

Lingualis—*contracts* the tongue.

The dorsum of the tongue is rendered *concave* by the genio-hyo-glossi drawing down its middle, and stylo-glossi raising its edges; the dorsum is rendered convex by the lingualis and hyo-glossi; the tongue is *protruded* from the mouth by the posterior fibres of the genio-hyo-glossi; *retracted* within the mouth by the lingualis, stylo-glossi, and anterior fibres of the genio-hyo-glossi.

## MUSCLES OF THE PHARYNX.

To the Pharynx four pairs of muscles are destined.

Constrictor pharyngis superior, constrictor pharyngis medius, constrictor pharyngis inferior—*contract* the bag of the pharynx.

Stylo-pharyngeus—*elevates* and *dilates* the pharynx. The soft Palate and Uvula have the following muscles.

Palato-pharyngeus—*draws* the velum downwards and backwards.

Constrictor isthmi faucium—*draws* the velum towards the tongue.

**Levator palati mollis**—*carries* the velum upwards and backwards.

**Tensor palati**—*spreads* out the velum.

**Azygos uvulæ**—*raises* the uvula.

The opening between the mouth and pharynx is *closed* by the constrictores isthmi faucium; the velum is *expanded* by the tensores palati; drawn *backwards* by the levatores palati and palato-pharyngei. The pharynx is *raised* by the digastrici, mylo-hyöidei, genio-hyöidei, genio-hyo-glossi, stylo-glossi: *depressed* by the sterno hyöidei, omo-hyöidei, thyro-hyöidei; *expanded* by the stylo pharyngei, and lastly, *contracted* by the three constrictors.

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## MUSCLES OF THE LARYNX.

Three pairs of muscles belong to the Larynx.

**Sterno-thyröideus**—*draws down* the thyroid cartilage.

**Thyro-hyöideus**—*raises* the thyroid cartilage.

**Crico-thyröideus**—*raises* the cricoid cartilage.

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## MUSCLES OF THE RIMA GLOTTIDIS.

These are the following.

**Crico-arytenöideus posticus**—*tightens* the vocal ligaments.

**Thyro-arytenöideus**—*relaxes* the vocal ligaments.

**Crico-arytenöideus lateralis**—*opens* the rima of the glottis.

**Arytenöideus transversus, arytenöideus obliquus**—*contract* the opening of the glottis.

**Aryteno-epiglottideus, thyro epiglottideus**—*draw down* the epiglottis.

## MUSCLES OF THE HEAD.

To the motions of the Head eleven pairs of muscles are destined.

Sterno cleido-mastöideus, rectus capitis anticus major, rectus anticus minor, rectus lateralis—*bend* the head *forwards*.

Splenius capitis, complexus, trachelo mastöideus, rectus posticus major, rectus posticus minor—*bend* the head *backwards*.

Obliquus capitis superior, obliquus capitis inferior—perform the semicircular motion of the head.

The trapezii will assist in extending the head.—*Lateral* motion will be performed by the flexor and extensor of the same side acting together. The head will be *rotated* by the alternate contraction of the flexor and extensors.

## MUSCLES OF THE NECK.

The motion of the Neck is produced by nine pairs of muscles.

Splenius colli, semi-spinalis colli, inter-transversalis colli, cervicalis descendens, transversalis colli—*carry* the neck *backwards*.

Longus colli, scaleni antici medii, et postici—*carry* the neck *forwards*.

The neck is carried to one side by the flexors and extensors contracting to the same side.

## MUSCLES OF THE BACK AND LOINS.

To the common motion of the Spine the following muscles are dedicated:—

Sacro-lumbalis, longissimus dorsi, multifidus spinæ, spinales dorsi, semi-spinalis dorsi, interspinalis dorsi, interspinalis lumborum—*extend* the spine.

Quadratus lumborum, psoas parvus—*flex* the spine.

The assistant flexor muscles are the abdominal muscles,

**rectus capitis, anticus major, longus colli, scalenii pectoralis major serratus magnus.** The *lateral* motions of the spine are performed by the flexors and extensors when they act on one side only.

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## MUSCLES OF THE THORAX.

The muscles of the Thorax are,

**Intercostales interni, intercostales externi, serratus posticus superior**—*raise* the ribs and to encrease the capacity of the chest.

**Diaphragma**—to *excrease*, by its contraction, the capacity of the chest.

**Triangularis sterni, serratus posticus inferior**—to *diminish* the capacity of the chest.

*In laborious inspiration*, besides the intercostals and diaphragm, the following muscles are called into action : **sterno cléido mastöideus, scaleni serratus posticus superior, serratus magnus, sub-clavius, pectorales, latissimus dori.** *In laborious expiration*, the abdominal muscles, **triangularis sterni, serratus posticus inferior, sacro-lumbalis, longissimus dorsi and quadratus lumborum**, are called into action.

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## MUSCLES OF THE ABDOMEN.

The muscles of the Abdomen are five pairs:—

**Obliquus abdominis externus, obliquus abdominis internus, transversalis abdominis, rectus abdominis, pyramidalis abdominis**—To draw down the ribs, to bend the body forwards, to compress the abdominal viscera, to raise the pelvis.

If the external oblique only acts, it inclines the body to the opposite side, if the internal oblique, it carries the body to the same side.

## MUSCLES OF THE THIGH.

For the motion of the Thigh there are fourteen pairs of muscles.

Psoas magnus, iliacus internus, pectineus—*bend* the thigh upon the pelvis.

Glutæus maximus—*extends* the thigh.

Glutæus medius, glutæus minimus—*abduce* the thigh.

Triceps—*adducts* the thigh.

Pyriformis, gemelli, obturator internus, obturator externus, quadratus femoris—*rotate* the thigh *outwards*.

Tensor vaginæ femoris—*rotates* the thigh *inwards*.

*Flexion* of the thigh is assisted by the tensor vaginæ femoris, and muscles arising from the anterior part of the pelvis, inserted into the femur and head of the tibia.

*Extension* is assisted by those muscles arising from the back part of the pelvis connected with the femur, head of the tibia, and fibula. *Abduction* is assisted by the psoas magnus and iliacus internus, pectinalis and flexor muscles of the knee joint. *Rotation outwards* is produced by the small rotators assisted by the glutæi and triceps. *Rotation inwards* is performed by the tensor vaginæ femoris, assisted by the sartorius, gracilis, and semitendinosus.

## MUSCLES OF THE LEG.

For the motion of the Knee-joint there are ten pairs of muscles.

Rectus, crureus, vastus internus, vastus externus—*extend* the leg.

Biceps, semi-membranosus, gracilis, sartorius, semitendinosus, popliteus—*bend* the leg upon the thigh.

The gastrocnemius externus and plantaris will assist in flexion of the leg.

## MUSCLES OF THE FOOT.

Eight pairs of muscles are destined for the motion of the Foot.

Gastrocnemius externus, gastrocnemius internus, Plantaris—*extend* the foot.

Tibialis anticus, peroneus tertius—*bend* the foot.

Tibialis posticus—*turns* the foot *inwards*.

Peroneus longus, peroneus brevis—*turn* the foot *outwards*.

The *extensors* are assisted by the tibialis posticus, peroneus longus and brevis, flexor longus digitorum, and flexor longus pollicis. The *flexors* are assisted by the extensor longus digitorum, and extensor proprius pollicis.

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## MUSCLES OF THE TOES.

Extensor longus digitorum pedis, extensor brevis digitorum pedis—*extend* the toes.

Flexor longus digitorum pedis perforans, flexor brevis digitorum pedis perforatus, flexor accessorius, lumbricales—*flex* the toes.

Extensor proprius pollicis—*extends* the great toe.

Flexor longus et brevis pollicis—*flex* the great toe.

Abductor et adductor pollicis—*abduce* and *adduce* the great toe.

Flexor brevis minimi digiti—*bends* the little toe.

Adductor minimi digiti, abductor minimi digiti—*adduce* and *abduce* the little toe.

Interossei—*abduce* and *adduce* the three middle toes.

Transversalis—*contracts* the sole of the foot.

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## MUSCLES OF THE SUPERIOR EXTREMITY.

Eight muscles are referred to the motions of the Scapula and Clavicle.

Pectoralis minor, subclavius—*depress* the scapula.

Levator anguli scapulæ, trapezius, omo-hyôideus—*raise* the scapula.



Rhomböideus major, rhomböideus minor—*carry the scapula backwards.*

Serratus magnus—*carries the scapula inwards.*

## MUSCLES OF THE ARM.

To the motions of the Arm are dedicated nine muscles.

Deltöides, supra spinatus—*raise the arm.*

Teres major, latissimus dorsi—*depress the arm.*

Subscapularis, coraco-brachialis—*carry the arm inwards.*

Teres minor, infra spinatus—*carry the arm outwards.*

Pectoralis major—*carries the arm across the chest.*

The coraco-brachialis, and clavicular portion of the pectoralis major, will *raise* the humerus; the infra spinatus, subscapularis, and biceps, will retain it in its position *when raised.* *Circumduction* is produced by the combined operation of all the muscles of the shoulder joint in succession.

## MUSCLES OF THE FORE-ARM.

To the motion of the Fore-arm eight muscles are destined:

Biceps flexor cubiti, brachialis, anticus—*flex the fore-arm.*

Triceps extensor cubiti, anconæus—*extend the fore-arm.*

Supinator radii longus, supinator radii brevis—*roll the radius outwards.*

Pronator radii teres, pronatus quadratus—*roll the radius inwards.*

*Pronation* is assisted by flexor carpi ulnaris, palmaris longus; *supination*, by the extensor longus pollicis, and continued action of the biceps.

## MUSCLES OF THE WRIST-JOINT.

Six muscles perform the motions of the Wrist-joint.

Flexor carpi radialis, flexor carpi ulnaris, palmaris longus—*flex* the wrist-joint.

Extensor carpi radialis longior, extensor carpi radialis brevior, extensor carpi ulnaris—*extend* the wrist-joint.

The *flexor* muscles are assisted by the flexor sublimis et profundus digitorum and flexor longus pollicis. The *extensors* are assisted by the extensors of the thumb and fingers. The hand is carried *inwards* by the flexor carpi ulnaris, extensor carpi ulnaris, and extensor digitorum communis; *outwards* by the action of the extensors of the thumb and wrist, and flexor carpi radialis.

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## MUSCLES THAT MOVE THE FOUR FINGERS.

Flexor digitorum sublimis, flexor digitorum profundus, lumbricales—*bend* the fingers.

Extensor digitorum communis—*extend* the fingers.

Interossei—*abduce* and *adduce* the fingers.

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## MUSCLES THAT MOVE THE FORE-FINGER.

Indicator—*extends* the fore-finger.

Abductor indicis—*abduces* the fore-finger.

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## MUSCLES THAT MOVE THE LITTLE FINGER.

Extensor parvus minimi digiti—*extends* the little finger.

Flexor parvus digiti minimi—*bends* the little finger.

Adductor minimi digiti—*adduces* the little finger.

## MUSCLES THAT MOVE THE THUMB.

Flexor longus pollicis, flexor brevis pollicis, flexor ossis metacarpi pollicis—*bend* the thumb.

Extensor ossis metacarpi pollicis, extensor primi internodii, extensor secundi internodii—*extend* the thumb.

Abductor pollicis, adductor pollicis—*abduce* and *ad-duce* the thumb.

## ANGIOLOGY.

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### OF THE ARTERIAL SYSTEM.

Arteries are membranous, elastic, cylindrical canals, formed of three tunics, and destined to carry the blood from the heart to every part of the body. The external coat termed the *tunica cellulosa* is formed of condensed cellular tissue, and is resisting and highly elastic. The middle coat *tunica media* (*tunica propria, musculosa et fibrosa* of some anatomists) is a dense strong tissue of a peculiar yellowish dun colour, elastic, composed of fibres nearly circular; these fibres are fragile, and possess but little extensibility. The internal coat, *tunica intima*, is a fine delicate structure, destitute of fibres, white, smooth, and transparent, it resembles in character the serous membranes. Arteries receive a coat from the lining membrane of the cavities through which they pass. The dura mater within the cranium, the pleura in the chest, and peritoneum in the abdomen afford an external covering. Arteries are minutely supplied with blood by the *vasa vasorum*, given off from the adjoining vessels; small veins *venæ venarum* accompany the *vasa vasorum* in their course, and return the blood. Though absorbents have not been demonstrated, the diseases of the vascular system afford us evident proofs of their existence. The nerves of arteries are derived from three sources; from the cerebral, spinal, and more especially from the ganglionic system. The origin of all the arteries is either from the pulmonary artery which arises from the right ventricle of the heart, or from the aorta which arises from the left ventricle of the heart.

## AORTA.

( *Arteria magna.* Murray.)

The Aorta arises from the upper and back part of the left ventricle, opposite the fourth or fifth dorsal vertebræ, it passes upwards towards the right side as high as the cartilage of the second rib, it is then directed backwards almost horizontally to the left side, descending as far as the left side of the body of the third dorsal vertebræ, it now continues its course directly downwards, within the posterior mediastinum, enters the abdomen between the tendinous crura of the diaphragm, passes on the fore part of the bodies of the lumbar vertebræ, as far as the fourth or fifth, where it bifurcates into the two common iliac arteries. The first portion termed *the anterior or ascending thoracic aorta*, at its commencement is covered by the pulmonary artery; it is afterwards placed between that artery and the descending vena cava; it lies upon the right pulmonary artery, lastly it is separated from the sternum by the anterior mediastinum. It gives off immediately behind and above the level of the semilunar valves the two coronary arteries.

*Arteria coronaria dextra* which runs between the right auricle and ventricle, and divides into three branches.

*Arteria coronaria sinistra* which passes between the left auricle and ventricle, and is sub-divided into anterior and posterior branches, *anastomosing* with the internal mammary and phrenic arteries.

The second portion termed *the arch of the aorta* (*Courbure sous sternale.* Chauss.), lies upon the trachea and upon the bodies of the second and third dorsal vertebræ. It is situated beneath the first portion of the sternum, and is connected with the pulmonary artery by the remains of the ductus arteriosus. It gives off from the convexity of its arch.

Arteria carotis sinistra      Arteria subclavia sinistra  
Arteria innominata.

## ARTERIA INNOMINATA.

(*Tronc brachio-cephalique. Chauss.*)

It arises from the arch of the aorta, ascends obliquely towards the right side; and opposite the sterno-clavicular articulation it divides into right common carotid and right subclavian arteries. It lies upon the trachea, and is covered at its origin by the vena innominata, sterno-cleidomastoid and sterno-thyroid muscles, and by the superior part of the sternum.

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## ARTERIÆ CAROTIDES COMMUNES.

(*Tronc céphaliques. Chauss.*)

The left common carotid arises from the arch of the aorta, nearly at a right angle; the right common carotid arises obliquely from the arteria innominata. They pass upwards and outwards on the side of the trachea, as far as the superior margin of the thyroid cartilage; here each vessel divides into two principal branches, namely, into *external* carotid, which is the anterior, and into *internal* carotid, which is the posterior. The carotid arteries are covered *anteriorly* by the sterno-hyoid, sterno-thyroid, and sterno-mastoid muscles, and crossed about the middle of their course by the omo-hyoid muscles, above this point only covered by the integuments, fascia, and platysma-myoides: *posteriorly* they lie upon the longi colli, recti capitis postici majores muscles; upon the inferior thyroideal arteries, upon the recurrent laryngeal, and great sympathetic nerves: *internally* they are in position with the trachea and thymus gland: *externally* with the internal jugular vein. Each common carotid artery is enclosed in a dense sheath of cellular tissue. The artery is situated on the inner side; the internal jugular vein on the outer side; between and behind both, is placed the eighth pair of nerves, and in front of the sheath, the descendens noni. The left common carotid differs in its course at its origin from the right

in the following respects—it has the *vena innominata* in front, and it lies upon the trachea, œsophagus, and thoracic duct.

## ARTERIA CAROTIS EXTERNA.

(*Carotis superficialis*. Murray. *Artère faciale*. Chauss.)

The external carotid passes upwards and backwards to the space between the ascending plate of the lower maxilla, and mastoid process of the temporal bone, where it enters the substance of the parotid gland, and divides into temporal and maxillary arteries. It is covered by the integuments, platysma myoides, and fascia; crossed by the posterior belly of the digastricus and stylo-hyoid muscles, and by the lingual and facial nerves: it lies upon the stylo-pharyngeus and stylo-glossus muscles, upon the glosso-pharyngeal nerve, and part of the parotid gland. It gives off the following branches:—

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|--------------------|----------------------------------|
| <i>Anteriorly</i>  | 1. Arteria thyroidea superior    |
|                    | 2. Arteria lingualis             |
|                    | 3. Arteria facialis              |
| <i>Posteriorly</i> | 4. Arteria occipitalis           |
|                    | 5. Arteria auricularis posterior |
| <i>Internally</i>  | 6. Arteria pharyngea ascendens   |
| <i>Superiorly</i>  | 7. Arteria temporalis            |
| <i>divides</i>     | 8. Arteria maxillaris interna    |
| <i>into</i>        | 9. Arteria transversalis faciei. |

1. *The superior thyraideal artery* (*art. thyroïdienne supérieure*. Chauss.) passes forwards and inwards, beneath the sterno-thyroid and omo-hyoid muscles, and gives off the following branches: 1st. *superficial* branch, distributed to the integuments; 2nd. *hyoid* branch, to the muscles which fix the larynx and os hyoides; 3rd. *laryngeal* branch, entering the larynx between the thyroid cartilage and os hyoides, supplying the mucous membrane of the larynx and arytenoid muscles; and lastly, *thyroideal* branch, which descends and divides into three

branches, distributed to the thyroid gland, and freely *anastomoses* with the opposite artery and with the inferior thyroideal.

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|------------------------|---------------------|
| 1. Ramus superficialis | 3. Ramus laryngeus. |
| 2. Ramus hyoideus      | 4. Ramus thyroideus |

2. *The lingual artery (art. linguale. Chauss.)* passes forwards and inwards, running parallel to, but above the cornu of the os hyoides, then under the hyo-glossus and genio-glossus muscles to the tongue. The lingual nerve takes nearly the same course, but is separated from the artery by the hyo-glossus muscle. It gives off, 1st, *hyoid* branches to the muscles, between the lower jaw and os hyoides; 2nd. *dorsal* branches to the back part of the tongue, fauces, and pharynx. The artery then divides into two branches, 3rd. *sublingual*, distributed to the mucous membrane of the mouth, hyo-glossus, and lingualis muscles; and 4th. into the *ranine*, which passes forwards under the lingualis muscle by the side of the frænum linguæ to the tip of the tongue, and freely communicates with the opposite artery.

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|-------------------------|-------------------------|
| 1. Ramus hyoideus       | 3. Arteria sublingualis |
| 2. Rami dorsales linguæ | 4. Arteria ranina.      |

3. *The facial artery (art. palato-labiale. Chauss.)* passes upwards and forwards to the back part of the submaxillary gland, it then ascends upwards and inwards over the base of the lower jaw, on the fore-part of the masseter muscle, and describes a tortuous course to the side of the mouth, nose, and to the inner canthus of the eye. At the commencement of its course it is placed behind the digastricus, and stylo-hyoid muscles, lingual nerve, and submaxillary gland; then, between the submaxillary gland and base of the lower jaw. It gives off, 1st. the *ascending palatine* artery, placed between the stylo-glossus and stylo-pharyngeus muscles, distributed to the tonsils, tongue, and palate, and *anastomosing* with the superior palatine artery; 2nd. *tonsil* branch, which runs along the stylo-glossus to the amygdalæ; 3rd. branches to the submaxillary gland; 4th. *submental* branch, placed in front of the mylo-hyoideus



and digastric muscles, beneath the platysma myoides, and *inosculating* with the inferior maxillary and lingual arteries; 5th. *inferior labial* branch to the muscles acting upon the lower lip; 6th. *orbicular* branches surrounding the lips; and, lastly, four branches supplying the sides of the nose, face, and inner canthus of the eye.

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|------------------------|------------------------------|
| 1. Arteria palatina    | 6. Arteriæ coronariæ         |
| 2. Ramus tonsillaris   | 7. Rami ad septum narium     |
| 3. Arteria glandulares | 8. Arteria dorsalis nasi     |
| 4. Arteria submentalis | 9. Arteriæ nasales laterales |
| 5. Arteria muscularis  | 10. Arteria angularis        |

The facial branches freely *anastomose* with the infra orbital, ophthalmic, and transverse arteries of the face.

4. *The occipital artery (art. occipitale. Chauss.)* passes backwards between the mastoid process of the temporal bone and transverse process of the atlas; it is covered by the digastricus, sterno-cleido-mastöideus, trapezius, splenius, complexus, trachelo-mastöideus; it crosses the internal jugular vein and eighth pair of nerves, and ultimately becomes superficial. It gives off branches to the lymphatic glands surrounding the jugular vein; 1st. *posterior meningeal* artery, entering the cranium by the foramen lacerum, basis cranii, supplying the dura mater, and *anastomosing* with middle meningeal artery; 2nd. *stylo mastöid*, distributed to the apparatuses of hearing, *anastomosing* with the meningeal and basilar arteries; and lastly it divides into *superficial and deep branches*, distributed to the muscles at the back part of the neck, head, and integuments of the occiput, communicating with branches from the vertebral, frontal, posterior, aural, and cervical arteries.

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|--------------------------------|---|
| 1. Arteria meningeae posterior | 3. & 4. Rami superficiales et profundi. |
| 2. Arteria stylo-mastöidea     |   |

5. *The posterior aural artery (art. auriculaire posteriore. Chauss.)* ascends backwards, first behind the parotid gland, afterwards between the mastoid process of the temporal bone, and meatus auditorius externus. It gives off branches to the digastric muscles, and to the fibro-cartilage of the auricle.

6. *The ascending pharyngeal artery (art. pharyngienne inférieure. Chauss.)* arises from the trunk of the carotid at its bifurcation, it passes upwards to the base of the cranium, by the side of the pharynx. It gives off branches to the pharynx and fauces; a branch likewise passes through the foramen lacerum basis cranii anterior, is distributed to the dura mater, and anastomoses with the superior thyroideal, and lingual arteries.

7. *The transverse artery of the face* comes off from the anterior border of the carotid, within the substance of the parotid gland; it accompanies Steno's duct over the masseter muscle, it is distributed to the orbicularis palpebrarum, zygomatic and buccinator muscles, and anastomoses with the infra orbital, buccal, and facial arteries.

*The anterior aural artery* is a small branch, distributed to the anterior portion of the auricle, it gives off a branch which enters the fissura glasseri, is distributed to the tympanum and anastomoses, with the arteria tympani and ramus ductus pterygoidei.

8. *The temporal artery (art. temporale)* passes upwards and outwards over the zygomatic process of the temporal bone, and ascends some way on the temporal fascia, it then divides into two branches, 1st, *temporo-frontal*, distributed to the integuments and muscles of the fore-head, anastomosing with the frontal and nasal arteries; 2nd. *temporo occipital* to the occiput, anastomosing with occipital and posterior aural arteries. It gives off before its division branches to the parotid gland; *superior auricular* branch to the superior and anterior part of the auricle; and, 3rd. the *deep temporal* branch passing behind the condyle of the jaw, and under the aponeurosis of the temporal muscle anastomosing with the internal maxillary artery.

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|-----------------------------|-----------------------------|
| 1. Art. temporo-frontalis   | 3. Art. profunda temporalis |
| 2. Art. temporo-occipitalis |                             |

9. *Internal maxillary artery (art. gutturo-maxillaire. Chauss.)* passes inwards nearly at a right angle beneath the neck of the lower jaw, between the pterygoid muscles to the pterygo-maxillary fossa. It gives off, 1st. the *deep auricular* branch distributed to the meatus ex-

ternus ; 2nd. *artery of the tympanum*, entering the fissura Glasseri, and distributed to the muscles of the tympanum ; 3rd. *small meningeal branch* passing upwards through the foramen ovale to the dura mater ; 4th. *middle meningeal artery*, ascending through the foramen spinosum, and continuing its course over the posterior inferior angle of the parietal bone to the dura mater, and also giving off a small branch which enters the hiatus Fallopii to the cavity of the tympanum and anastomoses with the meningeal posterior and stylo mastoid arteries ; 5th. *inferior maxillary artery*, which descends with the inferior maxillary nerve on the external border of the pterygöideus externus muscle, to the foramen mentale posterius ; it then takes the course of the canal and emerges from the foramen mentale anterius, and previous to its entrance into the canal it gives off a remarkable branch which is lodged in the groove on the inner surface of the maxilla, and distributed to the mucous membrane of the mouth and mylohyoid muscle ; the trunk of the artery within the canal gives branches to the teeth, lastly branches to the muscles of the lower lip, *anastomosing* with submental, inferior labial, and inferior coronary arteries. The next four branches from the internal maxillary artery, are given off to *temporal*, *pterygoid*, *masseter*, and *buccinator muscles*, respectively *anastomose* with branches from the facial, infra, orbital, and transverse arteries. In the spheno maxillary fossa it gives off important branches, namely :

10. *The infra orbital* which runs forwards and enters the infra orbital canal, and is eventually distributed to the muscles of the face, and *communicates* with the facial and transverse arteries.

11. *The vidian* which passes backwards into the pterygoid canal, in company with the vidian nerve, and *inosculates* with the artery of the tympanum and anterior auricular arteries.

12. *The descending palatine* which passes downwards into the posterior palatine canal, to the back part of the palate, supplies the bony and soft palate, and sends a branch through the foramen incisivum into the nose, *inosculating* with the ascending palatine and nasal arteries ; lastly, the *spheno palatine* which passes through

the foramen speno-palatinum, and is distributed to the mucous membrane, lining the nares, and also to the posterior cells of the æthmoid bone. By some anatomist a distinct branch is described under the name of the superior maxillary artery, as coming off from the deep temporal, or infra orbital artery, it descends over the tuberosity of the superior maxillary bone and is distributed to the teeth of the upper maxilla, and to the mucous membrane lining the antrum, Highmorianum.

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|---------------------------------|---------------------------------|
| 1. Arteria auricularis profunda | 8. Rami masseteres              |
| 2. Arteria tympani              | 9. Rami buccales.               |
| 3. Ramus meningeus parvus       | 10. Arteria infra orbitalis     |
| 4. Arteria meningeæ media       | 11. Ramus ductus pterygöidei    |
| 5. Arteria maxillaris inferior  | 12. Arteria palatina descendens |
| 6. Rami temporales              | 13. Arteria speno-palatina.     |
| 7. Rami pterygöidei             |                                 |

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## ARTERIA CAROTIS INTERNA.

(*Art. cérébrate antérieure. Chauss.*)

The internal carotid passes upwards and inwards by the side of the pharynx to the foramen caroticum, it is covered by the digastricus and stylo-hyoid muscles; it lies upon the rectus capitis anticus major, and upon the lingual nerve, (this nerve afterwards gets to the outer side) the internal jugular vein is placed externally, the eight pair of nerves and superior cervical ganglion of the great sympathetic on its inner margin. It continues its course along the carotid canal forwards, upwards, and inwards, enters the cavernous sinus, where it describes a most remarkable course, forming two curves resembling an italic S internal to the sixth pair of nerves; at the side of the sella turcica it perforates the dura mater, and divides into three branches. In the carotid canal it is surrounded by small communicating branches of the great sympathetic nerve, and in

the cavernous sinus, it is separated from the blood by the lining membrane of that cavity. In the sinus it gives off branches to the internal ear, and also branches which accompany the third, fourth, and fifth pair of nerves. The branches which the internal carotid gives off are

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|----------------------------------|-----------------------------|
| 1. Arteria ophthalmica           | 3. Arteria chorōidea        |
| 2. Arteria communicans posterior | 4. Arteria cerebri anterior |
|                                  | 5. Arteria cerebri media    |

1. *The ophthalmic artery (art. orbitaire. Chauss.)* runs forwards on the outer side of the optic nerve, through the foramen opticum, it then crosses in front of the optic nerve, beneath the levator oculi, and continues its course along the inner margin of the nerve, towards the inner canthus of the eye. *On the outer side* of the optic nerve, it gives off, 1st. the *lacrymal artery* to the abductor oculi and lacrymal gland; 2nd. the *central artery of the retina*, which penetrates the optic nerve, and runs in its centre, and is distributed to the retina, hyaloid membrane, and capsule of the chrystal-line lens. The *transverse portion* of the artery gives off, 3rd. the *supra orbital artery* placed above the levator oculi, distributed to the levator, superior oblique muscles and integuments of the forehead, *anastomosing* with the temporal artery; 4th, *short ciliary arteries* amounting to twenty or thirty which form an arterial circle around the optic nerve, pierce the sclerotic, and supply the choroid coat, and ciliary striæ and processes; 5th. *long ciliary*, arteries two in number, an external, and an internal, they pass in front of the sclerotic, pierce that coat, and form a zone around the iris; 6th. *the anterior ciliary* arteries, vary from four to twelve, pierce the sclerotic before it unites with the cornea, and form a circle around the iris; 7th. *a small branch* supplying the inferior oblique, depressor and abductor muscles. *On the inner side* of the optic nerve it gives off, 8th. *the posterior ethmoidal* artery, entering the cranium by the foramen orbitale internum posterius, to the dura mater and æthmoidal cells; 9th. *the anterior æthmoidal* which enters the cranium by the foramen anterius supplying the dura mater, and lining

membrane of the æthmoidal cells ; 10th. the *palpebral* arteries to the lacrymal sac, caruncula lacrymalis, palpebræ, conjunctiva, and adjacent muscles ; 11th. *nasal artery* which leaves the orbit above the tendon of the orbicularis palpebrarum, and is distributed to the lacrymal sac, caruncula lacrymalis, palpebræ, conjunctiva, and adjacent muscles ; 11th. *nasal artery*, which leaves the orbit above the tendon of the orbicularis palpebrarum, and is distributed to the lacrymal sac and adjacent muscles ; lastly, 12th. *frontal branch* which passes from the orbit with the nasal, and divides into three branches, *one* distributed to the orbicularis palpebrarum and corrugator supercilii, a *second* to the integuments, and a *third* to the frontal sinuses.

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|--------------------------------|--|
| 1. Arteria lacrymalis          | 7. Arteria oculi inferior                            |
| 2. Arteria centralis retinæ    | 8. and 9. Arteria ethmoidalis, anterior et posterior |
| 3. Arteria supra orbitalis     |  |
| 4. Arteriæ ciliares breves     | 10. Arteriæ palpebrales                              |
| 5. Arteriæ ciliares longæ      | 11. Arteria nasalis.                                 |
| 6. Arteriæ ciliares anteriores | 12. Arteria frontalis                                |

2. *The posterior communicating artery* (passes backwards, and unites with the posterior cerebral artery, given off from the basilar, and assists in forming the circle of Willis (*curculus Willisii*) and freely inosculates with the vertebral artery.

3. *The choroid artery* arises above it, passes backwards over the crus cerebri, penetrates the inferior cornu of the lateral ventricle, is distributed to that cavity, to the optic thalami, and assists in forming the choroid flexus.

4. *The anterior cerebral artery* (*art. lobaire antérieure*. Chauss.) runs forwards and inwards above the union of the optic nerves, along the under part of the anterior lobe of the brain, communicates with the opposite artery by means of a *transverse branch*. Each branch is afterwards subdivided into two branches, the smaller distributed to the anterior lobes of the brain, the *larger* is reflected backwards along the corpus callosum, and hemispheres of the brain, and freely *anastomoses* with the middle and posterior cerebral arteries,

1. Arteria communicans anterior    2. Arteria callosa.

5. *The middle cerebral artery (art. lobaire moyenne. Chauss.)* passes obliquely outwards, and is lodged in the fossa Sylvii; it supplies the middle and anterior lobes of the brain, and freely *inoscules* with the anterior and posterior cerebral arteries.

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## ARTERIA SUBCLAVIA.

(*Portion sous-clavière du tronc brachial. Chauss.*)

The subclavian artery on the right side, arises from the arteria innominata, on the left from the arch of the aorta. Each artery passes upwards and outwards, to the anterior scalenus muscle, then between the scalenus anticus and medius, and lastly downwards and outwards, beneath the subclavius muscle and clavicle into the axilla. The right subclavian artery has thicker coats, is larger, and more superficial; it runs obliquely upwards, then transversely, lastly downwards, forming thus an arch, the concavity downwards towards the right lung, with which it is in contact. *Anteriorly* it is covered by the sterno-hyoid, sterno-thyroid, and anterior scalenus muscles, by the subclavius and clavicle, by the subclavian vein, by the eight pair, branches of the great sympathetic, and phrenic nerves; *posteriorly* it is separated from the longus colli, and vertebral column by cellular tissue, also from the recurrent laryngeal nerve; it lies upon the pleura middle scalenus muscle and first rib. The left subclavian artery is more deeply situated; it passes nearly perpendicularly upwards, as far as the margin of the first rib, then outwards between the scaleni, lastly downwards. It is *covered* at its origin by the left subclavian vein, by the left lung, and nervus vagus, which, instead of crossing its direction, runs parallel with it: it lies upon the vertebral column, the longus colli, and lower cervical ganglion of the great sympathetic nerve. It lies parallel and close to the œsophagus, and left common carotid

artery. The branches given off may be divided into superior, inferior and external.

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|-----------------|----------------------------------|
| <i>Superior</i> | 1. Arteria vertebralis           |
|                 | 2. Arteria thyroïdea inferior    |
| <i>Inferior</i> | 3. Arteria mammaria interna      |
|                 | 4. Arteria intercostalis prima   |
| <i>External</i> | 5. Arteria cervicalis transversa |
|                 | 6. Arteria scapularis            |
|                 | 7. Arteria cervicalis profunda.  |

1. *The vertebral artery (art. cérébrale postérieur. Chauss.)* passes directly upwards through the foramina in the transverse processes of the six superior cervical vertebræ, winds backwards behind the superior articulating process of the atlas, enters the cranium by the foramen magnum, and, uniting with its fellow on the basilar process of the os occipitis, constitutes the basilar artery. It gives off, 1st. *the spinal cervical branches*, which enter the intervertebral foramina for the transmission of the cervical nerves, and form arterial circles around their roots; 2nd. *muscular branches*, distributed to the muscles of the neck, freely *anastomosing* with the occipital and deep cervical arteries; 3rd. *posterior meningeal artery*, supplying the dura mater; 4th and 5th. *posterior and anterior spinal arteries*, passing to the medulla spinalis, and freely *anastomosing* with each other and with similar branches entering the intervertebral foramina of the different regions; 6th. *inferior artery of the cerebellum*, which runs between the origins of the nervus vagus and spinal accessory nerves, and is distributed to the cerebellum, *inosculating with the superior artery*.

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|---------------------------------|-------------------------------|
| 1. Arteriæ spinales cervicales  | 4. Arteria spinalis anterior  |
| 2. Rami musculares              | 5. Arteria spinalis posterior |
| 3. Arteriæ meningeæ posteriores | 6. Arteria cerebelli inferior |

*The basilar artery (art. meso-cephalique. Chauss.)* is formed by the re-union of the two vertebral arteries; it ascends over the surface of the tuber annulare, rest-



ing upon the basilar process of the os occipitis, as far as the posterior clinoid processes of the sphenoid bone; it here divides into two branches. It gives off small branches to the tuber annulare; it then gives off, 1st. a branch which accompanies the portio mollis of the seventh pair of nerves, and is distributed to the cochlea, semicircular canals and vestibule; 2nd. *the superior cerebellar artery*, which passes outwards and backwards to the superior surface of the cerebellum; lastly, the third division forms the *posterior* arteries of the cerebrum—they run forwards and outwards, over the crura cerebri, to the under surface of the posterior lobes of the cerebrum, and divide into numerous branches. The continued trunk joins the communicating branch of the internal carotid, and completes the circle of Willis.—The circle of Willis is formed in front by the anterior arteries of the cerebrum, connected by a transverse branch, and the posterior communicating branches, joining the posterior cerebral arteries. It contains the union of the tractus opticus, infundibulum, corpora albicantia, pons Tarini, crura cerberi.

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|-------------------------------|------------------------------|
| 1. Arteria auditiva interna   | 3. Arteria cerebri posterior |
| 2. Arteria cerebelli superior | Circulus Willisii            |

2. *The inferior thyroideal artery (art. thyroïdienne inferieme. Chauss.)* passes upwards, and inwards, behind the common carotid artery, to the lower part of the thyroid gland; it divides into branches distributed to the thyroid gland, and freely anastomosing with the superior, and gives off a branch, the *ascending cervical*, which passes upwards on the scalenus anticus, and longus colli, to the deep muscles of the neck, which *anastomoses* with the vertebral posterior cervical, and occipital arteries.

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|------------------------------|----------------------------------|
| 1. Rami thyroidei inferiores | 2. Arteria cervicaleis ascendens |
|------------------------------|----------------------------------|

3. *The internal mammary (art. sous-sternale. Chauss.)* passes downwards and forwards, along the posterior surface of the sterno-costal cartilages, between the sterno-costalis, and intercostal muscles; it leaves

tween the supinator radii longus and flexor carpi radialis, between which it is continued to the wrist. It is accompanied by two venæ comites, and by the superficial branch of the spiral nerve on its outer side. It gives off the following branches :

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|-------------------------------|-------------------------------|
| 1. Arteria recurrens radialis | 6. Arteria radialis indicis   |
| 2. Rami musculares            | 7. Arteria palmaris profunda  |
| 3. Superficialis volæ         |                               |
| 4. Arteriæ dorsales           | 8. Arteriæ interossei volares |
| 5. Arteria magna pollicis     |                               |

1. *The recurrent radial artery (art. récurrente de l'épicondyle. Chauss.)* runs upwards on the inner side of the supinator, radii longus, in front of the external condyle of the humerus, and is distributed to the extensor muscles, and *anastomoses* with the deep radial.

2. *Muscular branches (art. radio-musculaires. Chass.)* come off on either side and supply the adjacent muscles ; one in particular directs itself transversely inwards along the lower margin of the pronator quadratus muscle, and *anastomoses* with a similar branch from the ulnar artery ; it also sends off branches to the radio carpal articulation (*art. radio-palmaire capienne transversale. Chauss.*)

3. *The superficial volar artery (art. radio-palmaire. Chauss.)* usually comes off about half-an-inch above the radio-carpal articulation ; it passes over the annular ligament, and freely *anastomoses* with the superficial palmar arch.

4. *The dorsal artery (art. sus-carpienne. Chauss.)* arises opposite the external border of the tendon of the extensor carpi radialis longior ; it runs inwards over the posterior surface of the second row of the carpal bones, divides into branches distributed to the carpal ligaments, the interossei muscles, and *anastomoses* with the perforating arteries of the deep palmar arch. Small branches are sometimes described as *dorsal arteries of the metacarpus*, distributed to the interossei muscles.

5. *The dorsal arteries of the thumb (art. sus-métacarpienne du pouce. Chauss.)* are frequently described as one artery. The radial artery gives off two branches.

artery ; 2nd. a *superficial, or ascending branch* which runs between the sterno, mastoid, and trapezius muscles, is distributed to the muscles, integuments, fascia, and lymphatic glands of the neck, freely *inoscultating* with the occipital and supra scapular arteries.

Arteria scapularis posterior.

Arteria cervicalis superficialis.

6. *The supra scapular artery (art. transversale de l'épaule. Sabatier)* is often given off from the inferior thyroideal ; it runs outwards and backwards, underneath the clavicle, to the notch of the scapula, and passes above the coracoid ligament, into the fossa supra spinata. It first gives off *branches* to the trapezius and deltoid muscles, which *anastomose* with the transverse cervical, thoracico-acromial, and occipital arteries ; 2nd. *branches* to the supra spinatus muscle, and capsule of the scapulo-humeral articulation, *anastomosing* with the circumflex arteries, *lastly branches* to the infra spinatus and teres minor, *inoscultating* with the posterior and subscapular arteries.

1. Arteria accromialis superior

2. Arteria supra spinalis  
3. Arteria infra spinalis.

7. *The deep cervical artery (art. trachelo-cervicale. Chauss.)* is sometimes given off by the first intercostal ; it ascends upwards on the bodies of the cervical vertebræ ; in its course it gives off branches to the longus colli, rectus capitis anticus major, and minor muscles ; sometimes it sends a *branch* in company with the vertebral artery. The deep cervical freely *inoscultates* with the vertebral and occipital arteries.

Arteria accessoria vertebralis.

## ARTERIA AXILLARIS.

(*La portion axillaire du tronc brachial. Chauss.*)

When the trunk of the subclavian artery has passed over the flat surface of the first rib, it takes the name of axillary. The axillary artery runs obliquely downwards and outwards, first between the subscapularis, and serratus magnus muscles, it is then situated on the inner edge of the coraco-brachialis, lastly it crosses the insertion of the teres major, and latissimus dorsi, when it takes the name of brachial. It is covered by the pectoralis major and minor muscles, in most of its course. At the upper part of its course the axillary vein is placed superficial to the artery, and at its sternal side, the nerves constituting the axillary plexus are on the outer side, and a little behind the artery, lower down the vein lies upon the artery, and the axillary plexus of nerves completely surround the vessel. It gives off the following branches.

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|---------------------------------|---|
| 1. Arteria thoracica superior   | 5. Arteria circumflexa humeri anterior  |
| 2. Arteria thoracica acromialis | 6. Arteria circumflexa humeri posterior |
| 3. Arteria thoracica longa      | 7. Arteria subscapularis.               |
| 4. Arteria thoracica axillaris  |   |

1. *The superior thoracic artery (la première des thoraciques. Chauss.)* descends obliquely forwards between the pectoralis major and minor, is distributed to these muscles and to the serratus magnus muscle, and *anastomoses* with the mammary and intercostal arteries.

2. *The long thoracic artery (la deuxième des thoraciques. Chauss.)* runs down almost vertically, beneath the external border of the pectoralis major, divides into branches distributed to the mamma, and *anastomoses* with the superior thoracic, mammary, and intercostal arteries.

3. *The acromial thoracic artery (la troisième des thoraciques. Chauss.)* passes upwards between the pectoralis major and deltoid muscles, and ramifies about the shoulder, it gives off a descending branch, accom-

to the thumb. *One* runs along the back part of the first metacarpal bone, and over the first phalanx of the thumb; *the second* along the tendon of the extensor tertii internodii, upon the inner edge of the first metacarpal bone of the thumb, and on its ulnar side.

6. *The artery of the index finger* runs along the radial side of the index finger to its last phalanx, when it *anastomoses* with the digital artery of the ulnar side.

7. *The deep palmar branch* enters the palm of the hand, between the metacarpal bone of the thumb, and index finger, and crosses the metacarpal bones; in its course it forms an arch, the convexity towards the head of the metacarpal bones; it gives off *anterior branches* to the lumbricales, *posterior*, or perforating branches running backwards through the interossei muscles, and *anastomosing* with the dorsal arteries, *superior branches* arising from the convexity of the arch, and distributed to the interossei, *inferior branches* distributed to the carpal ligaments. The deep palmar inosculates with the deep branch of the ulnar artery.

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## ARTERIA ULNARIS.

(*Artère cubitale. Chauss.*)

The Ulnar Artery is larger than the radial, is deeply situated at the upper part of its course, becoming superficial as it descends. It passes obliquely downwards and inwards, on the ulnar side of the fore-arm, as far as the wrist, it then bends outwards over the annular ligament, to the radial side of the os orbiculare, towards the metacarpal bone of the index finger, forming the superficial palmar arch. It is first covered by the pronator radii teres, flexor carpi radialis, palmaris longus, and flexor digitorum sublimis muscles, and by the median nerve; afterwards by the flexor carpi ulnaris muscle; in the palm of the hand, by the palmaris brevis, and palmar aponeurosis. It lies upon the brachialis anticus, the flexor profundus, pronator quadratus muscles, upon the annular ligament of the wrist, and upon the flexor tendons. In its course it is situated be-

adjoining muscles, and *anastomoses* with anterior, acromial and superior profunda arteries.

## ARTERIA BRACHIALIS.

(*Artère humérale. Chauss.*)

The Brachial Artery proceeding from the termination of the axillary artery, passes obliquely downwards and a little outwards to the middle of the bend of the elbow. It is covered by the integuments, fascia, aponeurosis of the biceps; at the upper part of its course slightly by the biceps, and coraco brachialis muscles; at the bend of the elbow by the pronator radii teres. It lies upon a portion of the triceps, the tendon of the coraco-brachialis and on the brachialis anticus muscle. It has to its inner side the coraco-brachialis and biceps muscles, and basilic vein: the median nerve, at the upper part of its course is situated on the outer side of the artery, and about the middle third of the arm it crosses the artery, when it is placed to the inner side. This artery is accompanied by two *venæ comites*. It gives off the following branches:—

- |                              |                               |
|------------------------------|-------------------------------|
| 1. Arteria profunda superior | 3. Ramus anastomoticus magnus |
| 2. Arteria profunda inferior | 4. Arteria nutritia humeri    |

1. *The superior deep artery (art. grande musculaire du bras. Chauss.)* arises from the upper and back part of the brachial artery, beneath the tendon of the latissimus dorsi, it winds obliquely downwards and outwards between the os humeri and triceps; about the middle of the arm it divides into two branches; one, *the deep ulnar*, which descends between the humerus and triceps muscle to the olecranon, and inosculates with the recurrent ulnar artery: the other, *deep radial* which accompanies the spiral nerve round the back part of the humerus to the outer condyle, and communicates with the recurrent radial.

the cavernous sinus, it is separated from the blood by the lining membrane of that cavity. In the sinus it gives off branches to the internal ear, and also branches which accompany the third, fourth, and fifth pair of nerves. The branches which the internal carotid gives off are

- |                                  |                             |
|----------------------------------|-----------------------------|
| 1. Arteria ophthalmica           | 3. Arteria chorōidea        |
| 2. Arteria communicans posterior | 4. Arteria cerebri anterior |
|                                  | 5. Arteria cerebri media    |

1. *The ophthalmic artery (art. orbitaire. Chauss.)* runs forwards on the outer side of the optic nerve, through the foramen opticum, it then crosses in front of the optic nerve, beneath the levator oculi, and continues its course along the inner margin of the nerve, towards the inner canthus of the eye. *On the outer side* of the optic nerve, it gives off, 1st. the *lacrymal artery* to the abductor oculi and lacrymal gland; 2nd. the *central artery of the retina*, which penetrates the optic nerve, and runs in its centre, and is distributed to the retina, hyaloid membrane, and capsule of the chrystal-line lens. The *transverse portion* of the artery gives off, 3rd. the *supra orbital artery* placed above the levator oculi, distributed to the levator, superior oblique muscles and integuments of the forehead, *anastomosing* with the temporal artery; 4th, *short ciliary arteries* amounting to twenty or thirty which form an arterial circle around the optic nerve, pierce the sclerotic, and supply the choroid coat, and ciliary striæ and processes; 5th. *long ciliary*, arteries two in number, an external, and an internal, they pass in front of the sclerotic, pierce that coat, and form a zone around the iris; 6th. *the anterior ciliary arteries*, vary from four to twelve, pierce the sclerotic before it unites with the cornea, and form a circle around the iris; 7th. *a small branch* supplying the inferior oblique, depressor and abductor muscles. *On the inner side* of the optic nerve it gives off, 8th. *the posterior ethmoidal artery*, entering the cranium by the foramen orbitale internum posterius, to the dura mater and æthmoidal cells; 9th. *the anterior æthmoidal* which enters the cranium by the foramen anterius supplying the dura mater, and lining

membrane of the æthmoidal cells ; 10th. the *palpebral* arteries to the lacrymal sac, caruncula lacrymalis, palpebræ, conjunctiva, and adjacent muscles ; 11th. *nasal artery* which leaves the orbit above the tendon of the orbicularis palpebrarum, and is distributed to the lacrymal sac, caruncula lacrymalis, palpebræ, conjunctiva, and adjacent muscles ; 11th. *nasal artery*, which leaves the orbit above the tendon of the orbicularis palpebrarum, and is distributed to the lacrymal sac and adjacent muscles ; lastly, 12th. *frontal branch* which passes from the orbit with the nasal, and divides into three branches, *one* distributed to the orbicularis palpebrarum and corrugator supercilii, a *second* to the integuments, and a *third* to the frontal sinuses.

- |                                |  |
|--------------------------------|--|
| 1. Arteria lacrymalis          | 7. Arteria oculi inferior                            |
| 2. Arteria centralis retinæ    | 8. and 9. Arteria ethmoidalis, anterior et posterior |
| 3. Arteria supra orbitalis     |  |
| 4. Arteriæ ciliares breves     | 10. Arteriæ palpebrales                              |
| 5. Arteriæ ciliares longæ      | 11. Arteria nasalis.                                 |
| 6. Arteriæ ciliares anteriores | 12. Arteria frontalis                                |

2. *The posterior communicating artery* (passes backwards, and unites with the posterior cerebral artery, given off from the basilar, and assists in forming the circle of Willis (*curculus Willissii*) and freely inosculates with the vertebral artery.

3. *The choroid artery* arises above it, passes backwards over the crus cerebri, penetrates the inferior cornu of the lateral ventricle, is distributed to that cavity, to the optic thalami, and assists in forming the choroid flexus.

4. *The anterior cerebral artery* (*art. lobaire antérieure*. Chauss.) runs forwards and inwards above the union of the optic nerves, along the under part of the anterior lobe of the brain, communicates with the opposite artery by means of a *transverse branch*. Each branch is afterwards subdivided into two branches, the smaller distributed to the anterior lobes of the brain, the *larger* is reflected backwards along the corpus callosum, and hemispheres of the brain, and freely *anastomoses* with the middle and posterior cerebral arteries.



1. Arteria communicans anterior  
2. Arteria callosa.

5. *The middle cerebral artery (art. lobaire moyenne. Chauss.)* passes obliquely outwards, and is lodged in the fossa Sylvii; it supplies the middle and anterior lobes of the brain, and freely *inoscules* with the anterior and posterior cerebral arteries.

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## ARTERIA SUBCLAVIA.

(*Portion sous-clavière du tronc brachial. Chauss.*)

The subclavian artery on the right side, arises from the arteria innominata, on the left from the arch of the aorta. Each artery passes upwards and outwards, to the anterior scalenus muscle, then between the scalenus anticus and medius, and lastly downwards and outwards, beneath the subclavius muscle and clavicle into the axilla. The right subclavian artery has thicker coats, is larger, and more superficial; it runs obliquely upwards, then transversely, lastly downwards, forming thus an arch, the concavity downwards towards the right lung, with which it is in contact. *Anteriorly* it is covered by the sterno-hyoid, sterno-thyroid, and anterior scalenus muscles, by the subclavius and clavicle, by the subclavian vein, by the eight pair, branches of the great sympathetic, and phrenic nerves; *posteriorly* it is separated from the longus colli, and vertebral column by cellular tissue, also from the recurrent laryngeal nerve; it lies upon the pleura middle scalenus muscle and first rib. The left subclavian artery is more deeply situated; it passes nearly perpendicularly upwards, as far as the margin of the first rib, then outwards between the scaleni, lastly downwards. It is *covered* at its origin by the left subclavian vein, by the left lung, and nervus vagus, which, instead of crossing its direction, runs parallel with it: it lies upon the vertebral column, the longus colli, and lower cervical ganglion of the great sympathetic nerve. It lies parallel and close to the œsophagus, and left common carotid

1. *The inferior phrenic arteries (art. sous diaphragmatiques. Chauss.)* arise from the fore-part; they pass upwards and outwards, over the crura of the diaphragm, and are distributed to that muscle, *inosculating* with the superior phrenic, musculo-phrenic, intercostal, and lumbar arteries. The right phrenic gives off branches to the liver, pancreas, and supra renal capsule; the left branches to the œsophagus, spleen, and supra renal capsule of the left side.

2. *The celiac artery (art. opisto-gastrique. Chauss.)* is a large but short trunk; it arises from the fore part of the aorta, where it is placed between the crura of the diaphragm, nearly opposite the eleventh or twelfth dorsal vertebræ, it passes downwards to the upper margin of the pancreas, where it divides into three branches.

Arteria coronaria

Artery hepatica.

Arteria splenica.

3. *The coronary artery (art. stomo-gastrique. Chauss.)* ascends towards the left side, as far as the œsophagus; it first gives off the *inferior œsophageal*; 2nd. *cardiac* branches to the œsophagus and cardiac extremity of the stomach; 3d. it then *descends* towards the right side, along the smaller curvature of the stomach, and gives off branches to the little omentum, to the *anterior* and *posterior* surface of the stomach, and freely *anastomoses* with the pyloric; 4th. it also sends frequently a large branch to the liver.

1. Arteriæ œsophagæ inferiores
2. Arteriæ cardiacæ posteriores

3. Ramus gasticus
4. Arteria hepatica sinistra.

4. *The hepatic artery (art. hépatique. Chauss.)* passes upwards and forwards, to the transverse fissure of the liver, between the layers of the little omentum; it then divides into two branches, *right gastro epiploic*, and the *proper hepatic artery*. The hepatic artery gives off 1st. the *pyloric*, which runs towards the left side, along the smaller curvature of the stomach, and freely *inosculates* with the coronary artery; the hepatic then sub-divides

ing upon the basilar process of the os occipitis, as far as the posterior clinoid processes of the sphenoid bone; it here divides into two branches. It gives off small branches to the tuber annulare; it then gives off, 1st. a branch which accompanies the portio mollis of the seventh pair of nerves, and is distributed to the cochlea, semicircular canals and vestibule; 2nd. *the superior cerebellar* artery, which passes outwards and backwards to the superior surface of the cerebellum; lastly, the third division forms the *posterior* arteries of the cerebrum—they run forwards and outwards, over the crura cerebri, to the under surface of the posterior lobes of the cerebrum, and divide into numerous branches. The continued trunk joins the communicating branch of the internal carotid, and completes the circle of Willis.—The circle of Willis is formed in front by the anterior arteries of the cerebrum, connected by a transverse branch, and the posterior communicating branches, joining the posterior cerebral arteries. It contains the union of the tractus opticus, infundibulum, corpora albicantia, pons Tarini, crura cerberi.

- |                               |                              |
|-------------------------------|------------------------------|
| 1. Arteria auditiva interna   | 3. Arteria cerebri posterior |
| 2. Arteria cerebelli superior | Circulus Willisii            |

2. *The inferior thyroideal artery* (*art. thyroïdienne inferieure*. Chauss.) passes upwards, and inwards, behind the common carotid artery, to the lower part of the thyroid gland; it divides into branches distributed to the thyroid gland, and freely anastomosing with the superior, and gives off a branch, the *ascending cervical*, which passes upwards on the scalenus anticus, and longus colli, to the deep muscles of the neck, which *anastomoses* with the vertebral posterior cervical, and occipital arteries.

- |                           |                                 |
|---------------------------|---------------------------------|
| 1. Rami thyroidei inferi- | 2. Arteria cervicalealis ascen- |
| ores                      | dens                            |

3. *The internal mammary* (*art. sous-sternale*. Chauss.) passes downwards and forwards, along the posterior surface of the sterno-costal cartilages, between the sterno-costalis, and intercostal muscles; it leaves

the chest under the cartilage of the sixth rib, and on the under surface of the rectus muscle, divides into two branches, an external and internal. It gives branches to the *thymus* gland, to the *mediastinum pericardium*, and to the *intercostal muscles*, these branches *inoscuate* with the aortic intercostals, and thoracic arteries ; 4th. a branch which accompanies the phrenic nerve, and is distributed to the diaphragm ; 5th. the internal branch, the *musculo phrenic* passes downwards and outwards, close to the attachment of the diaphragm, and is distributed to that muscle, *anastomosing* with the intercostals, lumbar, circumflex and diaphragmatic arteries ; 6th. the external branch, *superior epigastric*, is distributed to the recti, and freely *inosculates* with the inferior epigastric, musculo-phrenic, and lumbar arteries. Thus these two branches, by remarkable anastomoses connect the arteries of the superior and inferior extremities.

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| 1. Arteria mediastini               | 5. Arteria musculo phrenica      |
| 2. Arteria thymi                    |                                  |
| 3. Arteriæ intercostales anteriores | 6. Arteria epigastrica superior. |
| 4. Arteria comes nervi phrenici     |                                  |

4. *The first intercostal artery (art. intercostale supérieure. Chauss.)* is placed over the head of the first and second ribs, externally to the inferior cervical ganglion of the great sympathetic nerve, and gives off one or two trunks to the intercostal spaces. It sends branches to œsophagus, bronchia, pleura, and medulla spinalis, and *inosculates* with the aortic intercostal arteries.

5. *The transverse cervical artery (art. cervico-scapulaire. Chauss.)* is sometimes given off from the inferior thyroideal, it passes transversely outwards, over the *scaleni* muscles, above the nerves which constitute the axillary flexus, to the triangular space above the clavicle ; it divides into two branches, 1st. a *descending*, or *posterior* branch which passes downwards, under the *rhomboidei*, along the base of the scapula, and is distributed to the *rhomboidei*, *latissimus dorsi*, and *spinati* muscles, and freely *anastomoses* with the sub-scapular

ing upon the basilar process of the os occipitis, as far as the posterior clinoid processes of the sphenoid bone; it here divides into two branches. It gives off small branches to the tuber annulare; it then gives off, 1st. a branch which accompanies the portio mollis of the seventh pair of nerves, and is distributed to the cochlea, semicircular canals and vestibule; 2nd. the *superior cerebellar* artery, which passes outwards and backwards to the superior surface of the cerebellum; lastly, the third division forms the *posterior* arteries of the cerebrum—they run forwards and outwards, over the crura cerebri, to the under surface of the posterior lobes of the cerebrum, and divide into numerous branches. The continued trunk joins the communicating branch of the internal carotid, and completes the circle of Willis.—The circle of Willis is formed in front by the anterior arteries of the cerebrum, connected by a transverse branch, and the posterior communicating branches, joining the posterior cerebral arteries. It contains the union of the tractus opticus, infundibulum, corpora albicantia, pons Tarini, crura cerberi.

1. Arteria auditiva interna      3. Arteria cerebri posterior
2. Arteria cerebelli superior      Circulus Willisii

2. *The inferior thyroideal artery* (*art. thyroïdienne inferieure*. Chauss.) passes upwards, and inwards, behind the common carotid artery, to the lower part of the thyroid gland; it divides into branches distributed to the thyroid gland, and freely anastomosing with the superior, and gives off a branch, the *ascending cervical*, which passes upwards on the scalenus anticus, and longus colli, to the deep muscles of the neck, which *anastomoses* with the vertebral posterior cervical, and occipital arteries.

1. Rami thyroidei inferiores      2. Arteria cervicalealis ascendens

3. *The internal mammary* (*art. sous-sternale*. Chauss.) passes downwards and forwards, along the posterior surface of the sterno-costal cartilages, between the sterno-costalis, and intercostal muscles; it leaves

rectum, and freely *anastomoses* with the middle and inferior hæmorrhoidal arteries.

- |                                 |                                    |
|---------------------------------|------------------------------------|
| 1. Ramus anastomoticus sinister | 3. Arteria hæmorrhoidalis superior |
| 2. Arteriæ colicæ sinistræ      |                                    |

8. *The lumbar arteries (art. lombaires. Chauss.)* are four or five pairs; they arise from the sides and back part of the aorta, pass outwards between the vertebræ and psoæ and quadrati lumborum muscles, and divide into two sets of branches: the *posterior*, which are the smallest, are distributed to the muscles occupying the vertebral grooves, and to the medulla spinalis; the *anterior* branches supply the muscles of the loins, the transverse and oblique muscles of the abdomen, and freely *inosculate* with the internal mammary, lower intercostals, diaphragmatic, epigastric, and circumflex arteries.

9. *The middle sacral artery (art. mediane du sacrum. Chauss.)* arises from the angle of bifurcation of the aorta; it passes directly downwards on the anterior surface of the sacrum, behind the rectum, superior hæmorrhoidal vessels, and hypogastric plexus of nerves. It is distributed to the rectum, bladder, and sacral nerves, and freely *inosculates* with the ilio-lumbar and sacro-laterales arteries.

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## ARTERIÆ ILIACÆ COMMUNES.

(*Les artères pelvi-crurales. Chauss.*)

The Common Iliac Arteries result from the bifurcation of the aorta, they pass downwards and outwards, and opposite the sacro-iliac symphysis divide into two large branches, the hypogastric, and external iliac arteries. The common iliac artery of the right side is longer than the left, crosses the left common iliac vein, and upon the commencement of the vena cava; the common iliac artery of the left side, lies *external* and *anterior* its concomitant vein.

## ARTERIA ILIACA INTERNA.

(Art. hypogastrica. Murray.)

(Artère pelvienne. Chauss.)

The *Internal Iliac Artery* passes obliquely downwards into the pelvis, running directly in front of the sacro iliac symphysis. It is accompanied by the internal iliac vein, which is situated *posteriorly*, and is crossed in front by the ureter, and vas deferens. It usually divides into two principal branches, a *posterior* and an *anterior*. From the *posterior* branch are derived—

- |                            |                        |
|----------------------------|------------------------|
| 1. Arteria ilio-lumbaris   | 3. Arteria obturatoria |
| 2. Arteria sacra lateralis | 4. Arteria glutæa.     |

From the *anterior* division arise—

- |                                 |                            |
|---------------------------------|----------------------------|
| 5. Arteria umbilicalis          | 8. Arteria uterina         |
| 6. Arteriæ vesicales imæ        | 9. Arteria vaginalis       |
| 7. Arteria hæmorrhoidalis media | 10. Arteria ischiatica     |
|                                 | 11. Arteria pudica interna |

1. The *ilio lumbar artery* (art. iliaco-musculaire. Chauss.) passes obliquely outwards, under the psoæ muscles, and iliacus internus, and divides into a *superior* and an *inferior* branch; the former is distributed to the psoæ and quadratus lumborum muscles, and *inoscules* with the lumbar arteries, the latter is distributed to the iliacus internus muscle, os ilëi, and *anastomoses* with the circumflexa ossis ilii.

2. The *sacro-lateral artery* (art. médiane du sacrum. Chauss.) sometimes two or three trunks are met with, descends on the *anterior* surface of the sacrum, over the pyriformis muscle, and sacral nerves; it gives off branches to the rectum, sacrum, pyramidalis muscle, and to the canda equina, and *anastomoses* with arteria sacra media.

2. The *obturator artery*\* (art. sous-pubis-femorale.

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\* The obturator artery sometimes arises in common with the epigastric, it runs along Gimbernat's ligament, and in crural hernia, may be placed in front of the neck of the sac. In other instances it may arise from the femoral artery, and ascend along the pectinalis, entering the pelvis at the crural aperture. The artery in this case is placed behind the crural hernia. It has been given off from the ischiatic.

Chauss.) passes directly forwards on the inner edge of the brim of the pelvis, and runs through the opening in the upper part of the obturator ligament, perforating the pelvic fascia, the *superior* margin of the levator ani, and obturator muscles. It divides into *external* and *internal* branches. The *external branch* passes between the two obturator muscles, as far as the tuber ischii, is distributed to the adjacent muscles; the *internal branch* descends between the adductor brevis, and longus, to the muscles on the inner part of the thigh, and *anastomoses* with the internal circumflex, and ischiatic arteries.

4. *The gluteal artery (art. fessière. Chauss.)* passes downwards, outwards, and backwards, and leaves the pelvis at the upper opening of the ischiatic notch, above the pyriformis muscle, and rests in contact with the dorsum of the ilium; it frequently passes between the nerves, constituting the axillary plexus. It divides into two branches, superficial and deep. The superficial passes between the gluteus maximus, medius and pyriform muscles, to which it gives branches. The deep branch passes between the glutæus, medius, and minimus muscles, and divides into *superior* and *inferior* branches. The *superior* is distributed to the glutæus medius, and minimus and dorsum of the ilium; the *inferior* to the gemini, and ilio-femoral articulation, and *anastomoses* with the sacral, external circumflex, and ascending perforating branches of the profunda femoris arteries.

5. *The umbilical artery (art. umbilicale. Chauss.)* passes forwards and inwards to the side of the bladder, with which it is connected by cellular tissue; it then ascends towards the umbilicus external to the peritoneum. In the adult it is generally quite impervious, but for the space of one or two inches in that part of the artery which remains open, three or four small arteries are sent to the bladder.

6. *The vesical arteries (art. vesico-prostatique. Chauss.)* are small branches, irregular in their origin, sent to the vesiculæ seminales, prostate gland, fundus, and neck of the bladder.

7. *The middle hæmorrhoidal artery (art. hæmorrhoidale moyenne. Chauss.)* passes along the anterior surface of the rectum as far as the sphincter ani, and is distri-



buted to the rectum, *anastomosing* with the superior and inferior hæmorrhoidal arteries.

8. *The uterine artery (art. utérine. Chauss.)* passes between the laminae of the broad ligaments to the posterior surface of the uterus, *anastomosing* with the spermatic arteries. During gestation this vessel becomes greatly enlarged, and its branches on the inner surface of the uterus have a very peculiar tortuous course.

9. *The vaginal artery (art. vaginale. Chauss.)* passes forwards along the anterior and lateral parts of the vagina, towards the pærineum; it is distributed to the bladder, vagina and external parts of generation.

10. *The ischiatic artery (art. femoro-poplitée. Chauss.)* leaves the pelvis at the lower margin of the pyriformis muscle, through the lower part of the sciatic notch, above the lesser sciatic ligament, in front of the great sciatic ligament, in front of the great sciatic nerve; before leaving the pelvis, it sends branches to the rectum, bladder, and obturator internus muscle; it then gives off branches to the tuberosity of the ischium, one in particular accompanies the great sciatic nerve, between the great trochanter of the os femoris, and tuberosity of the ischium, *anastomosing* with the femoral and circumflex arteries; 2nd. the *coccygeal branch* which runs along the *posterior* sacro-sciatic ligament, to the coccygeus, and levator ani muscles, *anastomosing* with the pudic and hæmorrhoidal arteries; lastly, *muscular branches to the glutæi, small rotators, and flexor muscles of the leg.*

1. Arteria comes ischiadici    2. Arteria coccygea.
3. Rami musculaires.

11. *The internal pudic artery (art. sous-pelviennæ. Chauss.)* leaves the pelvis at the upper opening of the great sciatic notch, between the pyramidalis, and *posterior* border of the levator ani muscles; it re-enters the pelvis, by passing between the sacro-sciatic ligaments, and continues its course on the inner border of the tuberosity of the ischium, between the levator ani, and obturator internus muscles, bound down by the obturator fascia. At the *superior* part of the tuberosity of

cord, *anastomosing* with the spermatic arteries, and with the superficial epigastric from the femoral artery.

2. *The circumflex iliac artery* (*art. l'ilium circumflexe*) it arises from the *anterior* and *external* margin of the *external* iliac artery, runs outwards along the *internal* edge of the crural arch, to the *anterior superior* spinous process of the ilium, and then continues its course on the inner side of the crest of the ilium, between the internal, oblique, and transverse muscles of the abdomen. It divides into branches supplying the abdominal muscles, *psoas magnus*, *iliacus internus*, and inguinal lymphatic glands. It *inoscules* freely with the lumbar, ilio-lumbar, *internal* mammary, and *inferior* *intercostal* arteries.

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## ARTERIA FEMORALIS.

(*Portio fémorale de la crurale. Chauss.*)

*External* Iliac Artery having passed beneath Poupert's ligament, receives the name of femoral. It first passes downwards in front of the thigh, then downwards and inwards, lastly at the junction of the middle and lower third of the thigh, it winds obliquely backwards, through a tendinous opening between the adductor magnus, and vastus internus muscles, when it takes the name of popliteal artery. At the *superior* third of the thigh we find it situated in the centre of a triangular space, bounded *above* by the crural arch, on the *outer* side by the Sartorius, on the *inner side* by the adductor longus, and gracilis muscles. *Anteriorly* it is covered by the integuments, superficial fascia, lymphatic glands, and fascia lata, enclosed in a sheath formed in front by the fascia transversalis; *posteriorly* by the fascia iliaca; it *lies upon* the *psoas magnus*, crosses the insertion of the pectinalis, and adductor brevis muscles, separated from them by adipose cellular tissue; the femoral vein is placed on the *inner side*, within the same sheath, but separated by a distinct septum; on the *outer side* the *anterior* crural nerve is situated, lying between the *psoas magnus*, and *iliacus internus* muscles. The femo-

- |                                    |  |
|------------------------------------|--|
| 1. Rami musculares                 | 4. Ramus superior et vel profundus           |
| 2. Arteria hæmorrhoidalis inferior | 1. Arteria corporis bulbosi                  |
| 3. Arteria pærineæ                 | 2. Arteria dorsalis penis, vel superficialis |
| Ramus transversus perinæi          | 3. Arteria profunda penis                    |

## ARTERIA ILIACA EXTERNA.

(*Portion iliaque de la crurale. Chauss.*)

The External Iliac Artery extends from the bifurcation of the common iliac artery to the crural arch, passes downwards, and a little outwards on the inner border of the psoas magnus muscle, in front of the brim of the pelvis; it is covered by an expansion of the iliac fascia. The external iliac vein is on the inner side and behind the artery; the anterior crural nerve is to the outer side, and separated from the artery by the psoas magnus muscle, covered by the iliac fascia. It gives off two branches:

- |                        |                             |
|------------------------|-----------------------------|
| 1. Arteria epigastrica | 2. Arteria circumflexa ili. |
|------------------------|-----------------------------|

1. *The epigastric artery (art. sus-pubienne. Chauss.)* usually arises from the external iliac, about half-an-inch above Poupart's ligament; in some subjects it has been found to arise immediately behind Poupart's ligament; and in other cases, about an inch above the crural arch, it passes upwards and inwards *behind* the spermatic cord, on the *inner side* of the internal ring, between the fascia transversalis and peritoneum, to the external margin of the rectus muscle, and continues its course first along the outer margin of this muscle; midway between the umbilicus and pubis it passes behind the rectus muscle and perforates its sheath, passes between its fibres towards the umbilicus, and divides into numerous branches, freely *anastomosing* with the internal mammary and lower intercostals. It is usually accompanied by two veins. It gives off in its course small branches to the cremaster muscle, and to the spermatic

cord, *anastomosing* with the spermatic arteries, and with the superficial epigastric from the femoral artery.

2. *The circumflex iliac artery (art. ilium circumflexe)* it arises from the *anterior* and *external* margin of the *external* iliac artery, runs outwards along the *internal* edge of the crural arch, to the *anterior superior* spinous process of the ilium, and then continues its course on the inner side of the crest of the ilium, between the internal, oblique, and transverse muscles of the abdomen. It divides into branches supplying the abdominal muscles, psoas magnus, iliacus internus, and inguinal lymphatic glands. It *inoscules* freely with the lumbar, ilio-lumbar, *internal* mammary, and *inferior intercostal* arteries.

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## ARTERIA FEMORALIS.

(*Portio fémorale de la crurale. Chauss.*)

*External* Iliac Artery having passed beneath Poupart's ligament, receives the name of femoral. It first passes downwards in front of the thigh, then downwards and inwards, lastly at the junction of the middle and lower third of the thigh, it winds obliquely backwards, through a tendinous opening between the adductor magnus, and vastus internus muscles, when it takes the name of popliteal artery. At the *superior* third of the thigh we find it situated in the centre of a triangular space, bounded *above* by the crural arch, on the *outer* side by the Sartorius, on the *inner side* by the adductor longus, and gracilis muscles. *Anteriorly* it is covered by the integuments, superficial fascia, lymphatic glands, and fascia lata, enclosed in a sheath formed in front by the fascia transversalis; *posteriorly* by the fascia iliaca; it *lies upon* the psoas magnus, crosses the insertion of the pectinalis, and adductor brevis muscles, separated from them by adipose cellular tissue; the femoral vein is placed on the *inner side*, within the same sheath, but separated by a distinct septum; on the *outer side* the *anterior* crural nerve is situated, lying between the psoas magnus, and iliacus internus muscles. The femo-

ral artery (*the superficial femoral*) in the middle third of its course, is covered *anteriorly* and *superiorly*, by the sartorius, and by a strong tendinous fascia, connecting the vastus internus to the tendons of the adductor longus and magnus; *posteriorly* it lies between the adductor longus, and vastus internus muscles, on the inner side of the os femoris, separated from the bone by the last muscle; the femoral vein is placed behind the artery, the nervus saphenus lies on the *anterior* and *external* part of the femoral sheath, sometimes within its layers. When the femoral artery passes backwards, this nerve leaves the vessel and continues its course down the inside of the thigh, behind the inner condyle, covered by the sartorius muscle. It gives off—

- |                                      |                               |
|--------------------------------------|-------------------------------|
| 1. Arteriæ pudendæ externæ           | 4. Arteria profunda femoris   |
| 2. Arteria circumflexa superficialis | 5. Rami musculaires           |
| 3. Arteria epigastrica superficialis | 6. Rami perforantes           |
|                                      | . Ramus anastomoticus magnus. |

1. *The external pudics (art. scrotales.* Chauss.) pass inwards over the heads of the pectineus, and gracilis muscles, and give off branches to the inguinal glands, and scrotum in the male, to the labia pudendi in the female, and they *anastomose* with the obturator, and spermatic arteries. In cases of old scrotal hernia, these branches sometimes attain a large size.

2. *The superficial epigastric artery (art. inguinale.* Chauss.) arises from the front of the femoral artery, about half an inch below Poupart's ligament; it perforates the fascia lata, and ascends over the crural arch, between the layers of the superficial fascia, towards the umbilicus. It is distributed to the integuments, and inguinal glands, and *anastomoses* with the inferior epigastric and mammary arteries.

2. *The superficial circumflex artery (art. inguinale.* Chauss.) runs outwards beneath the integument, over the lower margin of the crural arch, to the spine of the ilium; it divides into small branches distributed to the skin, *anastomosing* with the deep circumflex, external circumflex, and gluteal arteries.

4. *The deep femoral artery* (*art. grand musculaire de la cuisse*. Chauss.) arises from the back part of the femoral, between the pubes and trochanter minor; it runs down behind the femoral artery, in front of the triceps. It gives off

1. Arteria circumflexa externa
2. Arteria circumflexa interna
3. Rami magni profundæ perforates.

1. *The external circumflex artery* (*art. sous-trochanterienne*. Chauss.) winds outwards under the sartorius, and rectus muscles, towards the root of the great trochanter; it divides into three sets of branches, *ascending* branches, which pass upwards under the sartorius, tensor vaginae femoris, and glutæi muscles, *anastomosing* with the gluteal, and internal iliac circumflex arteries; *transverse* branches, continued outwards and backwards, beneath the trochanter major, *anastomosing* with the gluteal, ischiatic and obturator arteries, lastly *descending* branches passing downwards, beneath the rectus, one in particular usually passes downwards, on the inside of the vastus internus, and communicates with the superior articular artery of the knee.

2. *The internal circumflex artery* (*art. sous-trochanterienne*. Chauss.) passes backwards, between the pectinalis, psoas magnus, and iliacus internus muscles, into the space between the greater and lesser trochanters. It divides into two branches, a *superior* and an *inferior*, or *transverse*. The *superior* sub-divides into two branches, an external (*arteria acetabuli*,) to the acetabulum, and obturator externus muscle, and *inoscules* with the obturator artery. The *inferior*, or *transverse* winds backwards, around the neck of the os femoris, it gives branches to the adductors, small rotators, (*rami trochanterici superiores et inferiores*) and to the origins of the flexors of the leg, and *anastomoses* with the external circumflex, gluteal, ischiatic, and inferior hæmorrhoidal arteries. Independent of the anastomosis which takes place between the two circumflex arteries at the posterior part of the os femoris, they communicate with each other, *anteriorly*, by a transverse branch, thus forming a complete arterial circle.

3. *The perforating branches (art. fémoro poplitées. Chauss.)* are four in number. The *first* perforating artery arises below the trochanter minor, and after having passed through the adductor muscle, divides into a *superior* and an *inferior* branch; the *former* branch passes upwards, towards the great trochanter, and may be traced into the glutæus maximus; the *latter* branch winds outwards, and is distributed to the vastus externus; it gives off a small branch to the os femoris. The *second* perforating artery passes through the aponeurosis of the second and third adductors to the back part of the thigh, it then divides into ascending and descending branches. This artery gives off a large branch, joined by one from the superficial femoral, the *nutritious artery of the bone*, it penetrates the nutritious canal between the first and third adductors. The *third* perforating artery passes over the short head of the biceps, to the flexor muscles. The *fourth* perforating branch may be considered the continued trunk, it perforates the adductor magnus, and descends along the *posterior* part of the thigh, supplying the popliteal space. These arteries *anastomose* with the circumflex, glutæal, ischiatic, femoral, and popliteal vessels, and also with each other.

5. *Small muscular branches of the superficial femoral artery* are given off from the femoral artery on either side to the adjacent muscle, one in particular assists in forming the nutritious artery.

6. *The perforating branches of the superficial femoral artery*, are two in number, distributed to the biceps, and vastus externus muscles, and freely *anastomose* with the branches from the deep femoral.

*The large anastomosing branch* comes off from the femoral artery, where it is about to perforate the tendon of the triceps, runs down between the fibres of the vastus internus muscle, and is distributed to the inner side of the femoro-tibial articulation, *inosculating* with the superior and inferior articular branches, and with the recurrent tibial artery.

## ARTERIA POPLITEA.

(*Portion poplitée de la crurale.*)

The Femoral Artery having passed through the tendon of the triceps, takes the name of popliteal ; it runs directly down behind the femoro tibial articulation ; on the back part of the poplitæus muscle it divides into two branches. It lies on the flat part of the os femoris, and is covered by the corresponding vein, and the sciatic nerve, protected by a quantity of fat and cellular tissue. It is placed between the biceps, outer condyle, external head of the gastrocnemius, origin of the plantaris, and and poplitæus muscles *on its outer side* ; semi-membranosus, semi-tendinosus, inner condyle inner head of the gastrocnemius muscle, *on the inner side*. It gives off the following branches.

- |   |   |
|---|---|
| 1. Arteria articularis superior interna | 4. and 5. Rami ad gastrocnemios         |
| 2. Arteria articularis superior externa | 6. Arteria articularis inferior externa |
| 3. Arteria articularis media            | 7. Arteria articularis inferior interna |

1. *The internal superior articular* winds inwards, under the tendon of the adductor magnus, above the inner condyle, and *anastomoses* with the external articular, internal articular inferior, and ramus anastomoticus magnus. These arteries form with those of the opposite side a net-work of blood-vessels which cover the patella ; a small branch passes on the edge of the internal semilunar cartilage, and enters the cavity of the knee-joint.

2. *The external superior articular* passes outwards above the outer condyle, beneath the biceps, is distributed to the outer part of the joint and communicates with the superior internal artery.

3. *The middle articular* is situated between the condyles, sub-divides into numerous small branches, which are distributed to the capsular and crucial ligaments.

4 and 5. *The arteries of the gastrocnemii* arise from the posterior and lateral parts of the popliteal artery,



and descend obliquely into the substance of the gastrocnemii muscles, and may be traced to the common tendon of these muscles.

6. *The inferior external articular* winds outwards between the popliteus and gastrocnemius muscles; beneath the tendon of the biceps and external lateral ligament; above the head of the fibula; along the external margin of the semilunar cartilage.

7. *The inferior internal articular* winds inwards around the head of the tibia; beneath the gastrocnemius muscle, internal lateral ligament, and tendinous aponeurosis from the flexor tendons. These arteries are distributed to the femoro-tibial articulation, and freely *anastomose* with the surales, and superior arteries.—The popliteal artery, on the inferior margin of the popliteus muscle, divides into *anterior* and *posterior* tibial arteries.

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## ARTERIA TIBIALIS ANTICA.

(*Art. tibiale antérieure. Chauss.*)

The Anterior Tibial Artery arising from the termination of the popliteal, passes forwards through the upper opening of the interosseous ligament, and reaches the fore part of the leg; it then descends obliquely downwards, first in front of the interosseous ligament, then on the lower and fore part of the tibia, passes over the tibio-tarsal articulation, over the superior surface of the astragalus, navicular and internal cuneiform bones, to the space between the first and second metatarsal bones, where it divides into two branches. It runs down first between the tibialis anticus and extensor longus digitorum pedis; is then situated between the tibialis anticus and extensor proprius pollicis; at the lower part of its course, it is continued behind the tendon of the latter muscle; on the dorsum of the foot it is placed on the outer margin of the same tendon. At the upper part of its course it is deeply situated; at the inferior third, covered only by the integuments, fascia, and annular ligament. It is accompanied by two venæ comites, and

by the deep branch of the fibular nerve which lies upon the artery. The following branches are given off:

- |                      |                           |
|----------------------|---------------------------|
| 1. Arteria recurrens | 4. Arteria metatarsa      |
| 2. Rami malleolares  | 5. Ramus anastomoticus    |
| 3. Arteria tarsea    | 6. Arteria pollicis pedis |

1. *The recurrent tibial artery* (*art. récurrente du genouil*. Chauss.) passes upwards between the fibres of the *tibialis anticus*, and pierces the fascia of the leg; it is distributed to the anterior part of the femoro-tibial articulation, and freely *anastomoses* with the branches from the popliteal artery.

2. *Malleolar branches* are divided into external and internal; they ramify on the outer and inner side of the ankle joint, and *communicate* with branches from the posterior tibial.

3 and 4. *The tarsal and metatarsal arteries* bend beneath the *extensor brevis*, towards the outer border of the foot, forming an arch (*arcus dorsalis tarseus*), and *anastomose* with the external malleolar, external plantar, and peroneal arteries. The dorsal arch gives off from its convexity, three interosseal arteries; they pass forwards in the second, third, and fourth interosseous spaces; each artery then divides into two branches. These arteries supply the outer side of the second toe, both sides of the third and fourth toes, and the inner side of the little toe; they also send off perforating branches, which dip down between the interosseal spaces and communicate with the plantar arch.

5. and 6. The two arteries formed by the division of the anterior tibial in the space between the first and second metatarsal bones, are, 1st. the *anastomosing* branch, which passes into the sole of the foot, through the interosseous space, and joins the external plantar arch; 2nd. *the artery of the great toe*, it passes forwards as far as the head of the metatarsal bone of the great toe, and then divides into two branches—one supplies the external border of the great toe, the *other* the inner border of the second toe.

*The anterior tibial artery*, in its course on either side, gives off small branches to the adjacent muscles.

## ARTERIA TIBIALIS POSTICA.

(Art. tibiale postérieure. Chauss.)

The posterior Tibial Artery descends in an oblique direction from the edge of the popliteus muscle to the fossa, between the os calcis, and internal malleolus; on the outer side of the flexor longus digitorum pedis; it is covered by a dense fascia, by the gastrocnemii muscles. In the lower half of the leg it is more superficial, lying between the tendo Achilles and tibia; lastly, where passing behind the inner malleolus, the tendons of the flexor longus digitorum pedis and tibialis posticus are in front, the tendon of the flexor longus pollicis behind.—It is accompanied by two venæ comites, and by the posterior tibial nerve, which is placed on its outer side. When the posterior tibial has arrived at the arch of the calcaneum, it divides into external and internal plantar arteries. The following are the branches given off:

- |                           |                            |
|---------------------------|----------------------------|
| 1. Arteria nutritia tibia | 4. Rami musculaires        |
| 2. Arteria peronea        | 5 and 6. Arteriæ plantares |

1. *The nutritious artery of the tibia* passes into the opening at the back part of the tibia, and is distributed to the bone.

2. *The peroneal artery* runs down the leg along the internal margin of the fibula, between that bone and the flexor longus pollicis muscle; it passes at the upper part of its course between the fibres of the tibialis posticus. It is accompanied by two venæ comites, and by the fibular nerve. In its course it gives off muscular branches *anastomosing* with branches from the anterior tibial; *the nutritious artery of the fibula*, which is distributed to that bone; lastly, about the inferior third of the leg, it divides into anterior and posterior fibular arteries. The *anterior* fibular passes forwards through the lower opening of the interosseous ligament, and descending between the tibia and fibula, is distributed to the tibio-tarsal articulation, freely *anastomosing* with the tarsal and metatarsal branches of the anterior tibial.

*The posterior fibular* continues its course downwards, behind the external malleolus, to the outer and back

part of the foot, and *anastomoses* with the external malleolar, and external plantar arteries. Three muscular branches are given off on either side to the great flexors.

5. *The internal plantar artery* is the smallest; it advances on the inner margin of the foot, between the abductor and flexor brevis pollicis muscles; it passes under the tendon of the flexor longus pollicis, and *anastomoses* with the plantar arch, and gives off a branch which supplies the outer side of the great toe, and inner side of the second toe.

6. *The external Plantar Artery* pursues a tortuous course across the sole of the foot, over the metatarsal bones, between the flexor brevis, and flexor accessorius, and forms an arch (*the plantar arch*) the convexity of which is directed forwards. It gives off four sets of branches, viz. *superior* or perforating branches, passing upwards through the interosseous spaces, and *anastomosing* with the descending branches of the metatarsal artery; *inferior* and *posterior* branches distributed to the interossei, and lumbricales muscles, lastly from the convexity of the arch the *anterior branches* come off: these vary in number; they pass forwards between the interosseous spaces, above the transversalis pedis muscle, and divide into branches supplying the three outer toes, and the outer side of the fourth toe.

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## OF THE PULMONARY ARTERY.

*The Pulmonary Artery* arises from the upper and left part of the right ventricle; it passes obliquely upwards, crossing the origin of the aorta as far as its arch, and opposite the second dorsal vertebra it divides into two trunks, one for each lung. The right pulmonary branch bends towards the right side behind the ascending thoracic aorta, behind the vena cava descendens to the right lung, *anteriorly* to the right bronchium; it divides into three branches, one for each lobe of the lung. The left pulmonary artery passes to the left side, in front of the descending thoracic aorta, *anteriorly* to the left bronchium, and divides into two branches. In the

## ARTERIA TIBIALIS POSTICA.

*(Art. tibiale postérieure. Chauss.)*

The posterior Tibial Artery descends in an oblique direction from the edge of the popliteus muscle to the fossa, between the os calcis, and internal malleolus; on the outer side of the flexor longus digitorum pedis; it is covered by a dense fascia, by the gastrocnemii muscles. In the lower half of the leg it is more superficial, lying between the tendo Achilles and tibia; lastly, where passing behind the inner malleolus, the tendons of the flexor longus digitorum pedis and tibialis posticus are in front, the tendon of the flexor longus pollicis behind.—It is accompanied by two venæ comites, and by the posterior tibial nerve, which is placed on its outer side. When the posterior tibial has arrived at the arch of the calcaneum, it divides into external and internal plantar arteries. The following are the branches given off:

- |                           |                            |
|---------------------------|----------------------------|
| 1. Arteria nutritia tibia | 4. Rami musculaires        |
| 2. Arteria peronea        | 5 and 6. Arteriæ plantares |

1. *The nutritious artery of the tibia* passes into the opening at the back part of the tibia, and is distributed to the bone.

2. *The peroneal artery* runs down the leg along the internal margin of the fibula, between that bone and the flexor longus pollicis muscle; it passes at the upper part of its course between the fibres of the tibialis posticus. It is accompanied by two venæ comites, and by the fibular nerve. In its course it gives off muscular branches *anastomosing* with branches from the anterior tibial; *the nutritous artery of the fibula*, which is distributed to that bone; lastly, about the inferior third of the leg, it divides into anterior and posterior fibular arteries. The *anterior* fibular passes forwards through the lower opening of the interosseous ligament, and descending between the tibia and fibula, is distributed to the tibio-tarsal articulation, freely *anastomosing* with the tarsal and metatarsal branches of the anterior tibial.

*The posterior fibular* continues its course downwards, behind the external malleolus, to the outer and back

part of the foot, and *anastomoses* with the external malleolar, and external plantar arteries. Three muscular branches are given off on either side to the great flexors.

5. *The internal plantar artery* is the smallest; it advances on the inner margin of the foot, between the abductor and flexor brevis pollicis muscles; it passes under the tendon of the flexor longus pollicis, and *anastomoses* with the plantar arch, and gives off a branch which supplies the outer side of the great toe, and inner side of the second toe.

6. *The external Plantar Artery* pursues a tortuous course across the sole of the foot, over the metatarsal bones, between the flexor brevis, and flexor accessorius, and forms an arch (*the plantar arch*) the convexity of which is directed forwards. It gives off four sets of branches, viz. *superior* or perforating branches, passing upwards through the interosseous spaces, and *anastomosing* with the descending branches of the metatarsal artery; *inferior* and *posterior* branches distributed to the interossei, and lumbricales muscles, lastly from the convexity of the arch the *anterior branches* come off: these vary in number; they pass forwards between the interosseous spaces, above the transversalis pedis muscle, and divide into branches supplying the three outer toes, and the outer side of the fourth toe.

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## OF THE PULMONARY ARTERY.

*The Pulmonary Artery* arises from the upper and left part of the right ventricle; it passes obliquely upwards, crossing the origin of the aorta as far as its arch, and opposite the second dorsal vertebra it divides into two trunks, one for each lung. The right pulmonary branch bends towards the right side behind the ascending thoracic aorta, behind the vena cava descendens to the right lung, *anteriorly* to the right bronchium; it divides into three branches, one for each lobe of the lung. The left pulmonary artery passes to the left side, in front of the descending thoracic aorta, *anteriorly* to the left bronchium, and divides into two branches. In t

## OF THE VEINS IN PARTICULAR.

The blood is returned from the interior of the cranium, by the two internal jugular veins; they commence from the termination of the lateral sinuses, at the fossæ jugulares, by a dilatation called the *sinuses of the jugular veins*, and pass down the neck, on the outer side of the internal carotid artery, on the outside of the common carotid, and terminate in the subclavian veins, just behind the clavicles. They receive the blood from the sinuses of the brain, by this term is understood the venous canals, formed externally of the laminae of the dura mater, and lined internally by a smooth and polished membrane, continuous with the lining membrane of the veins. These sinuses are of triangular shape, and present numerous transverse bands, which appear to be rudimentary valves.

*Sinuses of the Brain.*

Superior longitudinal sinus	Cavernous sinuses
Two lateral sinuses	Superior petrous sinuses
Straight sinus	Inferior petrous sinuses
Inferior longitudinal sinus	Transverse sinus of os
Circular sinus of Ridley	sphenöideum
Posterior occipital sinus	Transverse sinus of the os
Anterior occipital sinus	occipitis.

## VEINS OF THE BRAIN.

*Superior cerebral veins*, which terminate in the superior longitudinal sinus.

*Lateral and inferior cerebral veins*, which terminate in the lateral sinuses.

*Anterior cerebral veins*, which terminate in the superior petrous sinuses.

*Venæ galeni*, which terminate in the straight sinus.

*Superior cerebellar veins*, which terminate in the straight sinus.

*Inferior cerebellar veins*, which terminate in the lateral sinuses.

*Ophthalmic veins*, which terminate in the the cavernous sinuses.

The ophthalmic veins receive the *central vein of the retina*, the *anterior* and *posterior æthmoidal*, *lacrymal*, *ciliary*, *muscular* and *frontal veins*.

In the neck the internal jugular vein receives—

Facial veins  
Deep occipital veins  
Lingual veins

Pharyngeal veins  
Superior thyroideal veins  
Laryngeal veins.

## OF THE VEINS WHICH CONCUR TO FORM THE FACIAL VEINS.

The *anterior facial vein* extends from the inner canthus of the eye, to the inferior margin of the inferior maxilla, it is placed in front of the masseter, behind the facial artery ; it unites below the angle of the jaw with the posterior facial vein, and forms a short trunk which terminates in the internal jugular. The branches it receives correspond with the distribution of the facial artery. The *posterior facial vein* is placed in front of the ear, within the substance of the parotid gland, superficial to the external carotid artery, its branches correspond partly with those given off from that vessel.

## VEINS WHICH CONCUR IN FORMING THE EXTERNAL JUGULAR VEIN.

The *external Jugular Vein* is formed by the internal maxillary, and by branches from the temporal and superficial occipital veins, below the angle of the jaw ; it runs obliquely downwards and outwards, situated at its commencement on the inner side of the sterno-mastoid muscle ; it then crosses that muscle, and passes down on its outer margin, under the omo-hyöideus muscle, and terminates in the subclavian vein, behind the clavicle. It receives the cutaneous cervical veins.



## VEINS OF THE UPPER EXTREMITIES.

*The Veins of the superior Extremities* are divided into two classes, superficial, and deep ; the distribution of the latter, corresponds with that of the arteries ; veins accompany the radial ulnar, brachial, and axillary arteries and their branches. The superficial are the cephalic, median, and basilic veins.

*The Cephalic Vein* commences at the root of the thumb, from the junction of several dorsal veins of the hand, runs upwards on the radial side of the fore-arm, then on the outer margin of the biceps, and lastly it bends forward between the pectoralis major, and deltoid muscles, and joins the axillary vein. In its course it receives numerous subcutaneous branches, at the bend of the arm it is joined by the median cephalic vein.

*The Basilic Vein* commences at the little finger, from a small vein called the vena salvatella ; it runs superficially along the ulnar side of the fore-arm, then on the inner side of the fore-arm, in company with the brachial vessels, and enters the axilla, where it forms the axillary vein, it receives numerous branches in its course, and at the bend of the arm it is joined by the median basilic vein.

*The long Median Vein* is situated in the middle of the fore-arm, and runs between the cephalic and the basilic veins, at the bend of the elbow it divides into two branches, one forms the cephalic, the *median cephalic*, the other joins the basilic, the *median basilic vein*.

*The Axillary Vein* having passed beneath the clavicle, takes the name of subclavian, this passes inwards, over the scalenus anticus, and enters the chest. The subclavian vein on the left side crosses the arteries arising from the arch of the aorta, and opposite the cartilage of the first rib, uniting with its fellow, forms the vena cava superior.

Into the subclavian veins are emptied—

External jugular vein  
Vertebral vein  
Internal jugular vein  
Mediastinal vein  
Pericardiac vein

Thymic vein  
Internal mammary vein  
Inferior thyroideal vein  
Superior intercostal vein  
Thoracic duct.

*The superior Vena Cava* passes down on the right side of the ascending thoracic aorta, and terminates in the upper and back part of the right auricle, before it enters that cavity of the heart, it receives the *vena azygos*.

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## THE VENA AZYGOS.

*The Vena Azygos* usually commences by two or three branches of communication, with the upper left lumbar veins, these branches enter the chest, either between the crura of the diaphragm, or passing between the fibres of that muscle, it returns the blood from the

Right bronchial veins	Right intercostal veins
Dorsal vertebral veins	Lower left intercostal veins
Right æsophageal veins	Superior diaphragmic veins

*The Vena Azygos* passes upwards, within the posterior mediastinum, on the right side of the descending thoracic aorta, having ascended as high as the third dorsal vertebræ, it passes forwards from the spine, and terminates in the descending cava, where that vessel passes behind the pericardium. The upper left intercostal veins which do not terminate in the *vena azygos*, unite with the left bronchial, left æsophageal, and form one common trunk, which terminates in the left subclavian vein. The common trunk has been called the left *vena azygos*, but is more frequently described as the left bronchial vein.

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## VEINS OF THE LOWER EXTREMITY.

*The anterior Tibial, posterior Tibial, and fibular Arteries* are each accompanied by veins, which terminate in the popliteal vein, this accompanies the popliteal artery, perforates with it the tendon of the triceps, where it takes the name of femoral vein. The femoral vein runs first behind, then on the inner margin of the fe

ral artery, having passed under Poupart's ligament, it constitutes the external iliac vein. The popliteal and femoral veins receive branches corresponding to the distribution of the popliteal and femoral arteries.

*The superficial Veins* are the vena saphena major and minor.

*The saphena major Vein* commences by small branches on the inner side of the foot, these unite and form a trunk behind the inner malleolus; it ascends obliquely backwards, along the inner part of the leg, and passes behind the internal condyle of the femur. It continues its course along the inner part of the thigh, and terminates in the femoral vein, below Poupart's ligament. It receives in its course cutaneous branches, at the upper part of the thigh it is joined by the external pudic, external epigastric, and external circumflex veins.

*The saphena minor Vein* commences by several branches upon the back of the foot; behind the external malleolus, they unite and form a single trunk; it ascends obliquely upwards, on the outer side of the leg, and terminates in the popliteal vein.

## EXTERNAL ILIAC VEIN.

*The femoral Vein* having passed under Poupart's ligament, takes the name of external iliac vein, it ascends as high as the sacro-iliac symphysis, where, uniting with the internal iliac vein, it forms the common iliac trunk. It receives the epigastric and circumflex iliac veins, and also a considerable branch from the spermatic cord. The external iliac veins are placed beneath, and internally to the artery of the same name. The *right external iliac* passes *behind* the bifurcation of the right common iliac artery, at this point it unites with the internal iliac vein. The *left external iliac* goes *behind* the left internal iliac artery, and here uniting with the left internal iliac vein, forms the left common iliac.

## COMMON ILIAC VEINS.

*The common Iliac Veins* result from the union of the external and internal iliac veins, the right common iliac vein is behind, and to the outer side of its artery, the left common iliac vein is on the inner side of its artery, it passes before the last lumbar vertebra, behind the right common iliac artery, to form the ascending cava. The internal iliac veins receive the

External hæmorrhoidal veins	Dorsal veins of the penis
Hypogastric veins	Dorsal veins of the clitoris in the female

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## VENA CAVA INFERIOR.

*The inferior or ascending Vena Cava* is formed on the last lumbar vertebræ by the union of the two common iliac veins; it ascends on the right side of the bodies of the lumbar vertebræ, on the right side of the abdominal aorta, to beneath the liver; it is covered by the peritoneum and duodenum. Opposite the liver it frequently contracts: it is then lodged in the fissura venæ cavæ, between the lobulus spigelii and right lobe of the liver; it passes through the triangular opening in the central tendon of the diaphragm, and terminates immediately in the under and back part of the right auricle of the heart. It receives the

Sacral veins	Renal veins
Lumbar veins	Hepatic veins.
Right spermatic vein	Inferior phrenic veins

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## VENA PORTÆ, AND ITS BRANCHES.

*The Vena Portæ* is that large vein which returns the blood from the intestines, spleen, and stomach to the liver. It is distributed in numerous branches through

the liver, like an artery. The blood which it carries is destined for the formation of bile ; the remaining blood is returned by the *venæ hepaticæ* to the inferior vena cava. The trunk of the *vena portæ* is divided into two branches ; the *superior*, which is dispersed through the liver, is called the *vena portæ hepatica* ; the *inferior* is termed the *vena portæ ventralis*.

*The Vena Portæ Ventralis* is formed behind the pancreas, by the union of the three following principal branches :—

1st. *The Splenic Vein*, which receives the coronary, pancreatic, and left gastro-epiploic veins.

2nd. *The superior Messenteric Vein*, which receives the right and left colic veins, the right gastro-epiploic, and pyloric veins.

3rd. *The inferior Messenteric Vein*, which arises from branches which return the blood from the rectum, sigmoid flexure of the colon and meso-colon.

The trunk formed by the union of these branches, passes between the layers of the little omentum, to the *sulcus transversus*, or porta of the liver.

## OF THE CIRCULATION OF THE BLOOD.

The Blood is brought by the *venæ cavæ* from every part of the body, and from the heart itself, to the right auricle ; the right auricle contracting, drives the blood into the right ventricle ; the right ventricle contracting, the blood is propelled into the pulmonary artery ; regurgitation from the ventricle back into the auricle is prevented by the tricuspid valve ; the semilunar valves, placed at the commencement of the pulmonary artery, prevent the blood returning from that vessel back into the heart. The blood propelled into the extreme ramifications of the pulmonary artery, is then received by the pulmonary veins, and carried to the left auricle of the heart. The left auricle, upon receiving

this mass of blood, immediately contracts, and its contents are impelled into the left ventricle; the left ventricle contracts, and forces the blood into the aorta. The blood cannot return from the ventricle into the auricle, on account of the mitral valve, nor from the aorta itself on account of its three semilunar valves. The blood, after giving off nourishment and supplying the varied secretions to every part of the body, is returned impoverished by very small veins, passing from them into larger, and lastly into the ascending and descending *venæ cavæ*, which re-convey it to the right auricle, after having received a reinforcement of nutritive matter from the digestive organs by the thoracic duct.

In the foetus, the course of the blood is far different, for the foetus receives its blood from the mother, by means of the umbilical vein, and returns it to the mother by the umbilical arteries contained in the umbilical cord. The umbilical cord is composed of the umbilical vein and two umbilical arteries. The umbilical vein arises from the conflux of the veins of the placenta uterina, which receive their blood from the ends of the arteries of the uterus; it then passes through the umbilicus in front of the peritoneum to the liver. The greatest proportion of the blood is circulated through the liver, and afterwards carried to the ascending cava by the *venæ cavæ hepaticæ*: a small portion of the blood at once passes without circulating through the liver to the cava, by a peculiar vessel termed the *ductus venosus*. The blood, by the *venæ cavæ*, is brought to the right auricle; this contracting, forces the greatest proportion of the blood through the foramen ovale into the left auricle. The remaining blood it carried into the right ventricle, from which it passes into the pulmonary artery: a small portion only circulates through the lungs, for the greater part passes into the aorta through the *canalis arteriosus Botalli*, which arises from the pulmonary artery, and terminates obliquely in the arch of the aorta. The portion of the blood which has been distributed to the lungs is returned to the left auricle, where it becomes mixed with that which has passed at once from the right side of the heart through the foramen ovale. The left auricle contracting, the

blood is propelled into the left ventricle, and from this cavity into the aorta, where it becomes mixed with that portion which has passed at once from the pulmonary artery by the *canalis arteriosus*. From the aorta the blood passes as in the adult into every part of the body, and thus it is propelled into the umbilical arteries. The umbilical arteries arise from the internal iliac arteries, ascend on the side of the bladder to the umbilicus, pass through it with the umbilical cord to the placenta, in which their terminations are joined with the very small veins of the uterus, and thus their blood is returned to the mother.

## NEUROLOGY.

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THE nerves were, for a long period, considered as forming one uniform system, they are now divided into two general divisions, distinct from each other, the nerves of animal life and those of organic life. The nerves of animal life emanate from three principal portions of the cerebral mass, from the brain, the tuber annulare and its extensions, and from the medulla spinalis. The division of the nerves, according to Willis, has been invariably followed by the anatomists of this country, excepting by Charles Bell.

Willis, Vieussens, Winslow, and Bichat, enumerate ten pair of cerebral nerves.

- 1st pair, Nervi Olfactorii
- 2d pair, Nervi Optici
- 3d pair, Nervi Motores Oculorum
- 4th pair, Nervi Pathetici
- 5th pair, Nervi Trigemini
- 6th pair, Nervi Motores Externi
- 7th pair, Nervi Auditorii, one called Portio Mol-  
lis, the other Portio Dura
- 8th pair, Nervi Vagi, which include the Nervi  
Accessorii, and Glosso-pharyngei
- 9th pair, Nervi Linguales
- 10th pair, Nervi Sub-occipitales



which become more and more minute, until they seem at length to be softened down into a kind of pulp, and are no longer visible to the eye, and cannot be prosecuted by dissection.

In tracing the course of the nerves, numerous parts are found to be supplied by two distinct sets, whose functions had been unexplained and had baffled the ingenuity of the anatomist, till by the interesting researches of Charles Bell, this mystery was unravelled. There are, besides the nerves of smell, hearing, and vision, four systems combined; viz. nerves of sensation, nerves of voluntary motion, nerves of respiratory motion, and lastly, the nerves of organic life distributed to the organs of digestion, circulation, respiration, and the secretions on which depend the nutrition, growth, and whatever is directly necessary to animal existence. On examining the spinal marrow, it is found to consist of different columns of nervous matter; each lateral column consists of *three tracks*; one for *voluntary motion*, one for *sensation*, and the middle track for *respiration*. Thirty pair of nerves take their origin from the lateral portions of the column, and are regular in their origin and distribution. These constitute the "simple and uniform system" of Bell. Each nerve has two distinct series of roots, one from the *posterior* track, one from the *anterior* track. The posterior filament comes out remarkably abrupt from the track, and their roots form a regular row or series, these converging towards the foramina of the sheath of the spinal marrow, and being collected together, form a knot or ganglion. The anterior roots come out more irregular, and form a wider surface, and join the posterior roots, beyond the ganglia. The thirty nerves thus formed of two distinct fasciculi, are suited to perform by the combination of properties, which they acquire through their double roots, all the offices of the trunk and limbs. The important discovery of their office is undoubtedly due to Charles Bell, though numerous attempts have been made in France, to deprive him of the honour. He has proved that in the *posterior* track of the medulla spinalis, and in the *posterior* fasciculi of nerves reside *sensation*, in the *anterior* track, and *anterior* fasciculi, *voluntary motion*. Under this division is

placed the fifth pair, and sub-occipital nerves. They are found to arise by double roots, to possess ganglia, and the double function of sensation and motion. The remaining nerves are called the "irregular or super-added;" they are distinguished by a single root, are simple in their origin, and irregular in their distribution, they go to parts already plentifully supplied with nerves; they are not capable of exciting perception, and are only furnished with the faculty of transmitting nervous influence. Of these are—"The *third fourth and sixth* to the eye; the *seventh* to the face; the *ninth* to the tongue; the *glosso-pharyngeal* to the tongue and pharynx; the *nervus vagus* to the heart, lungs, and stomach; the *spinal accessory* to the muscles of the shoulder; the *phrenic* to the diaphragm; the *external respiratory* to the outside of the chest." This is the system which has been so ably brought forward by Charles Bell, and illustrated and confirmed by the most beautiful and satisfactory experiments. I shall adopt the arrangement of Sæmmerring, with certain modifications, and combine with it the functions, as assigned by Charles Bell. Having repeated many of the experiments, and having witnessed others conducted by Segalas and Majendie, I am convinced of the accuracy *en masse* of Charles Bell's deductions.

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## THE NERVES OF THE HUMAN BODY

May be thus arranged :—

- 1st pair, *Nervi olfactorii*, destined to excite perception of smell.
- 2nd pair, *Nervi optici*, destined to excite the impressions of light.
- 3rd pair, *Nervi motores oculorum*, motory nerves of the eye.
- 4th pair *Nervi respiratorii oculorum*, respiratory nerves of the eye.
- 5th pair, *Nervi trifaciales*, universal nerves of sensation of the head, face, cavities of the nose, mouth and tongue.

- 6th pair, *Nervi oculorum abducentes*, motory nerves of the eye.
- 7th pair, *Nervi respiratorii faciei*, respiratory nerves of the face.
- 8th pair, *Nervi auditorii*, destined to excite the impressions of sound.
- 9th pair, *Nervi respiratorii glosso-pharyngei*, respiratory nerves to the tongue and pharynx.
- 10th pair, *Nervi respiratorii pneumo-gastrici*, respiratory nerves to the larynx, heart, lungs, and stomach.
- 11th pair, *Nervi respiratorii trachelo-dorsales*, respiratory nerves to the neck and shoulders.
- 12th pair, *Nervi motores linguæ*, the motory nerves of the tongue.  
*Nervi respiratorii, into-thoracica* to the diaphragm.  
*Nervi respiratorii exto-thoracici*, to the external respiratory muscles.
- Eight pairs of *Nervi cervicales*, giving off the nerves of sensation and voluntary motion to the upper extremities.
- Twelve pairs of *Nervi dorsales*, giving off the nerves of sensation, and voluntary motion to the trunk.
- Five pairs of *Nervi lumborum*, giving off the nerves of sensation, and voluntary motion to the upper extremities.
- Five pairs of *Nervi sacrales*, giving off the nerves of sensation, and voluntary motion to the pelvic viscera, and organs of generation.
- Nervi sympathetici, sive Nervi vitæ organicæ*, nerves of organic life.

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### *Of the Cerebral Nerves.*

## NERVI OLFACTORII.

The first pair of nerves that emanates from the brain is the olfactory, anciently called *processus mammillares*. Each nerve arises by three filaments; the external and

the longest, is directed outwards and backward, to the bottom of the fissura sylvii; the inner, which is the shorter and broader, is prolonged as far as the corpus callosum, both these origins are formed by the medullary substance; the middle is ciceritious, and may be traced into the posterior part of the anterior convolutions of the brain. Some anatomists have described these nerves as arising from the corpora striata. Gall and Spurzheim have shewn, that in many of the lower animals, where the corpora striata do exist, no olfactory nerves can be traced. The three filaments unite and form a soft flattened trunk, which converges and passes forwards in a remarkable groove, on the under part of the anterior lobes of the brain; it terminates in an oval shaped ciceritious body, called by some anatomists, the *bulbus olfactorius*, situated over the cribriform plate of the ethmoid bone; from it are given off numerous nervous filaments, divided into three fasciculi—external, middle, and internal, each filament being, at its exit, enclosed in a fibrous canal, derived from the dura mater. The external fasciculi are distributed to the mucous membrane, investing the superior spongy bones, the middle to the roof of the nasal fossæ, the internal form an intricate plexus on the septum narium. These nerves offer the following peculiarities: their trunk has three roots, they possess no neurilemma, are lodged in a particular groove of the brain, and, lastly, Gall has shewn that the bulb is made up of white and ciceritious substance, is hollow in the lower animals, and communicates with the lateral ventricles.—They give the sense of smell.

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## NERVI OPTICI.

The second pair, the optic nerves, is the largest of the cerebral nerves; they have been usually described as emanating from the thalami nervorum optictorum; it has been shewn by Gall and Spurzheim, that they may be traced issuing by a broad, white fibrous band, from the anterior quadrigeminal bodies, which turn round upon the outer edge of the thalami nervorum optico-

rum, under the cerebral crura. They receive fibres at right lines, without decussating from the corpora geniculata, and from the tuber cinereum. The nerves thus formed, run forwards, approach each other, and unite on the anterior part of the pituitary fossa; whether they cross each other so that the left nerve passes to the right, or the right to the left, is a point still under dispute. Several cases have been given by Gall and Spurzheim, of atrophy of one nerve being continued on the opposite side, after the junction of the two. These distinguished anatomists recognize a partial decussation of the fibres; they believe the outermost filaments continue their course without decussating. This arrangement may reconcile us to the great discrepancy of opinion which exists on the question. In many fish, the doctrine of decussation is favoured, their optic nerves plainly cross each other without any union. The portion of the nerve before they come in contact, presents the appearance of a broad, flat band, soft, and entirely pulpy, and is termed the tractus opticus. From their commissure they become round and dense, separate from each other, pass outwards and forwards, through the foramina optica to the posterior surface of the orbit, perforate the sclerotic and choroid coats of the globe of the eye, to the nasal side of its axis, and are expanded into a very delicate pulpy substance, termed the retina. They afford the sense of vision.

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### MOTORES OCULORUM.

The *third* pair, or motores oculorum, arises from the inner margin of the crura cerebri, between the posterior artery of the cerebrum, and superior artery of the cerebellum, behind the tuber cinereum; close to the pons varolii (the crura cerebri may be said to be the continued track of the anterior column of the medulla spinalis, destined to motory motion); the nerves pass forwards and outwards, along the external wall of the cavernous sinuses, lodged in a sheath of dura mater, first above the *fourth* pair, and first division of the *fifth* pair of nerves, afterwards behind these nerves, to the sphenoidal fissure; here each nerve divides into two branches,

a *superior* placed above the optic nerve, and an *inferior* below, and to the outer side. The superior is distributed to the levator oculi, and levator palpebræ; the inferior divides into three branches, an internal branch distributed to the adductor oculi, a middle to the depressor oculi, and an external branch to the obliquus oculi inferior; it also sends off a branch to the lenticular ganglion. These nerves give motion to all the muscles of the eye, with the exception of the abductor and superior oblique muscles.

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## NERVI RESPIRATORII OCULORUM.

(*Nervi Pathetici.*)

The *fourth* pair, respiratory, or pathetic nerves, is the *smallest* of the cerebral nerves; they arise by three filaments from the inferior corpora quadrigemina, from the valve of Vieussens, and from the processus a cerebello ad testes. ("The column of medullary matter which constitutes that part of the medulla oblongata from which the respiratory nerves arise, terminates upwards or at its anterior extremity, just under the corpora quadrigemina, and there the fourth pair arises."—*C. Bell.*) They pass upwards and forwards, between the cerebrum and cerebellum, on the side of the pons varolii, to the external margin of the posterior clinoid processes of the sphenoid bone; continue their course along the external wall of the cavernous sinuses within the sheath of the dura mater, first behind, afterwards above the third pair to the sphenoidal fissure, enter the orbits; each nerve is then directed upwards and inwards, above the levator oculi and levator palpebræ, and is finally exclusively distributed to the obliquus oculi superior. Gall and Spurzheim maintain that this nerve has "no prerogative over the other nerves of motion, in expressing the affections and passions; the name patheticus, or ogling nerve, is misapplied." Charles Bell's researches have shewn that it is a nerve of expression, a respiratory nerve, and establishes a relation between the eye and the extended respiratory system.

## NERVI TRIFACIALES.

The *fifth* pair, or Trigeminal Nerves, is included in the simple and uniform system of Bell; they have distinct origins, and are endowed with two distinct powers, namely, that of sensation and that of voluntary motion. Each nerve consists of one hundred fine filaments, arising by two fasciculi. The *anterior*, which are the smallest, emanate from the crura cerebelli, and may be traced into the corpus pyramidale (*motory track*); the *posterior* fasciculi, the largest, are derived from the corpus restiforme (*track of sensation*), are collected into a trunk, pass forwards and over the petrous portion of the temporal bone, expand and form the semilunar ganglion (*the essential character of all the nerves of sensation*). This ganglion, sometimes called Gasserian, is situated beneath the laminae of the dura mater to the outside of the cavernous sinus, and gives off three nervous trunks, viz. — the ophthalmic, superior maxillary, and inferior maxillary nerves. Bell has shewn that the two former, endowed only with sensation, pass to parts already plentifully supplied with motory nerves; whilst the latter, namely, the *inferior maxillary*, is joined beyond the ganglion in the foramen ovale, by the anterior fasciculi (*fibres of motion*), and thus a compound nerve is formed, suited to the two offices which it is destined to perform, namely, sensation and voluntary motion. — Magendie has strangely endeavoured to prove that the olfactory, optic, and auditory, are not the nerves of smelling, seeing, and hearing; and that the *fifth* pair, if they do not exercise these functions, are the regulators of the senses above named.

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## NERVUS OPHTHALMICUS.

The *Ophthalmic Nerve* passes forwards, between the laminae of the dura mater, along the external wall of the cavernous sinus, where it is joined by a small branch from the great sympathetic nerve, and enters the orbit through the sphenoidal fissure, in company

with the *fourth* and *sixth* pair of nerves. It divides into three branches, frontal, nasal, and lacrymal.

*The Frontal Nerve*, the largest is the continued trunk of the ophthalmic nerve; it passes forwards and upwards, to the upper part of the levator palpebræ, and divides into two branches, external and internal. (1) The *external* branch passes directly forwards through the foramen supra orbitarium, and is distributed to the occipito frontalis, corrugator supercilii, and integuments of the forehead, communicating with temporal branches from the facial. (2) The *internal* branch runs inwards, above the pulley of the superior oblique muscle, is distributed to the orbicularis palpebrarum, and communicates with the infra trochlearis nerve.

- Nervus frontalis.* (1) Nervus frontalis externus.  
(2) Nervus supra trochlearis.

*The Nasal Nerve* passes to the inner side of the orbit, over the optic nerve, under the levator palpebræ, levator oculi, and superior oblique muscles; it is joined by a branch from the superior cervical ganglion of the great sympathetic nerves. It first gives off a slender filament to the lenticular ganglion, (1) next two or three *ciliary filaments*, to the choroid coat of the eye; it then divides into two branches, an internal and an external. (2) The *external branch* takes a most remarkable course, it enters the cranium through the foramen orbitale anterius, in company with the æthmoidal artery, perforates the dura mater, leaves the cranium by one of the anterior foramina of the æthmoid bone, and divides into two filaments, one distributed to the petuitary membrane, the other descends along the under surface of the internal spines of the ossa nasi, perforates the cartilage of the nose, and is distributed to the integuments. (3) The *external branch* continues its course forwards, to the outer part of the orbit, under the infra oblique muscle, is distributed to that muscle, to the lacrymal sac and adjacent parts, communicating with the infra orbital, and facial nerves.

- (1) Rami ciliares. (2) Nervus nasalis internus.  
(3) Nervus infra trochlearis.  
z. 3.



*The Lacrymal Nerve* passes outwards, to the outer part of the orbit; above the muscles of the globe, it divides into two branches, *one* distributed to the lacrymal gland, the other branch pierces the malar bone, and communicates with the facial and superior maxillary nerves.

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## LENTICULAR GANGLION.

*The Lenticular Ganglion*, by Willis, Sæmmerring, Mekel, Finn, and other distinguished continental anatomists, and by anatomists of this country, has been derived from the *third* pair of nerves receiving a branch from the nasal division of the *fifth*. Chaussier has shewn that there exists between this ganglion, and the first cervical ganglion of the great sympathetic, a remarkable branch of communication within the carotid canal. I therefore adopt the opinion of that distinguished professor and consider it as belonging to this system.

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## NERVUS MAXILLARIS SUPERIOR.

*The Superior Maxillary Nerve* passes downwards, through the foramen rotundum, to the space between the tuberosity of the superior maxillary bone, and root of the pterygoid process of the sphenoid bone, it then passes forwards into the sphe-no-maxillary fissure, enters the canalis suborbitarius, and emerges at the foramen infra orbitarium. It is first joined by two branches from the sphe-no-palatine ganglion.\* It gives off (1) *malar* branches to the orbicularis palpebrarum and lacrymal gland, which unite with the lacrymal nerve; (2) *temporal* branches to the temporal muscles; (3) *posterior dental* to the molar teeth; (4) *anterior dental* to the in-

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\* The sphe-no-palatine ganglion was first pointed by Mekel, and has been described after his name; it is usually enumerated as a ganglion of the *fifth* pair, but it belongs to the ganglionic system. It gives off the following branches, Nervi nasales anteriores et superiores, nervus pterygoideus, seu vidianus, nervus palatinus (vide nerves of organic life) Observation anatomique sur un noeud, ou ganglion du second rameau de la cinquieme paire des nerfs du cerveau nouvellement decouvert, par Mekel, Année 1749, Berlin.

cisor and canine teeth, and to the lining membrane of the antrum highmorianum. At its exit from the canal, it takes the name of infra orbital nerve, and divides into branches distinguished as (5) *palpebral* (6) *labial*, (7) and *nasal* filaments, and which communicate with the facial, infra trochlearis, and nasal nerves, and are distributed to the muscles and integuments of the adjacent parts.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| (1) Nervus subcutaneus<br>malæ      | (5) Nervi palpebrales in-<br>feriores |
| (2) Nervus temporalis               | (6) Nervi labiales superi-<br>ores    |
| (3) Nervi dentales posteri-<br>ores | (7) Nervi nasales superfi-<br>ciales. |
| (4) Nervi dentales anteri-<br>ores  |                                       |

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### NERVUS MAXILLARIS.

*The Inferior Maxillary Nerve* is the third, and largest branch of the fifth, it consists of two portions which become intimately united ; it passes from the cranium by the foramen ovale, downwards, between the pterygoid muscles, to the posterior opening of the inferior maxillary canal, where it divides into three branches ; viz. lingual, or true *gustatory*, *auricular*, and *inferior dental*. It first gives off muscular branches to the (1) temporal, (2) masseter, (3) pterygoid, and (4) buccinator muscles. (5) Next, the *lingual* or true gustatory nerve ; it passes first between the pterygöideus externus and circumflexus palati, then between the pterygöideus internus and ascending ramus of the lower maxilla, lastly, it passes to the tongue, between the mylo-hyöideus and hyo-glossus muscles, in company with the duct of the sub-maxillary gland. At the commencement of its course it is joined by the corda tympani ; opposite the sub-maxillary gland, this nerve leaves the lingual to enter a remarkable ganglion, the lingual, or maxillary ganglion, situated on the sub-maxillary gland. The lingual nerve, in its course, gives off small filaments to the pterygöideus internus muscle, and tonsil

gland, ultimately it is distributed to the tongue, and assists in forming the papillæ. It is the only nerve giving the sense of taste. (6) The *auricular, or superficial temporal* passes outwards between the condyle of the lower maxilla, and meatus auditivus externus, it divides into branches distributed to the parotid gland, uniting with the facial nerves, and into branches, to the auricle and to the temporal muscle; these branches communicate with the occipital nerve. (7) The *inferior dental* is the largest branch, it descends between the pterygoid muscles, separated from the internal pterygoid muscle, and lingual nerve, by the internal lateral ligament, to the posterior opening of the inferior maxillary canal, continues its course along the canal, and emerges at the foramen mentale, when it takes the name of *mental nerve*. Previous to its entrance into the canal, it gives off a remarkable branch, (8) the *mylo-hyoid*, which passes in a groove, on the inner side the angle, and base of the jaw, supplying with filaments the mylo-hyoideus muscle, and sub-maxillary gland. Within the canal it gives off (9) branches to all the roots of the teeth. (10) The *mental nerve* divides into numerous filaments, distributed to the muscles and integuments of the lower lip, and freely communicating with the facial nerve.

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|--|-------------------------------------|
| (1) Nervi temporales profundi interni et externi | (6) Nervus temporalis superficialis |
| (2) Nervi masseteres                             | (7) Nervus dentalis                 |
| (3) Nervi pterygoidei                            | (8) Nervus mylo-hyoideus            |
| (4) Nervi buccales                               | (9) Nervus dentalis                 |
| (5) Nervus gustatorius                           | (10) Nervus mentalis                |
|  | (11) Nervi labiales inferiores.     |

### NERVI OCULORUM ABDUCENTES.

The *sixth* pair of nerves, or abductor nerves, arises from the tractus motorius, namely, from the corpora pyramidalia, where they enter into the pons varolii.—Each nerve passes forwards along the basilar groove,

and enters the cavernous sinus, on the outer side of the internal carotid artery, separated from the blood by the lining membrane of that cavity ; it is here joined by one or two filaments from the great sympathetic nerve ; it enters the orbit by the sphenoidal fissure, and is exclusively distributed to the abductor muscle of the eye by numerous filaments.

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## NERVI RESPIRATORII FACIEI.

*The seventh pair of Nerves, or Fasial or Portio Dura, arises from between the corpora restiformia, and corpora olivaria (tractus respiratorius) ; each nerve passes forwards into the meatus auditorius internus, enters the aqueduct of Fallopius, emerges at the foramen stylo-mastôideum, and is buried in the substance of the parotid gland. Within the canal it is joined by the vidian nerve, this nerve afterwards detaches itself from the facial, and leaves the tympanum by the Fissura Glasseri, under the name of corda tympani. The facial nerve first gives small filaments to the muscles of the membrana tympani, in the parotid gland, (1) filaments to the meatus auditivus externus and auricle, communicating with the occipital nerve ; (2) muscular branches to the styloid muscles and digastricus, uniting with the glosso-pharyngeal and nervus vagus ; it then divides into two branches, temporo-facial, and cervico-facial. (3) The temporo-facial nerve passes forwards, through the substance of the parotid gland, and divides into numerous branches, and as the distribution of these branches bear some resemblance to a goose's foot, the plexus has been called *pes anserinus*. (4) The superior branches are distributed to the temporal, occipito frontalis muscles and integuments, uniting with the frontal, malar, and inferior maxillary nerves ; (5) the middle branches run inwards, towards the inner canthus of the eye, are distributed to the orbicularis palpebrarum, and adjacent muscles, and freely communicate with the frontal, infra trochlearis, and infra orbital nerves ; (6) the inferior branches cross the masseter and buccinator muscles, in company with the parotid duct, and*

supply the muscles, nose, and upper lip, *anastomosing* with the preceding branches. (7) The *cervico-facial branch* descends behind the ramus of the lower jaw, towards the angle; it divides into (8) *branches* distributed to the buccinator, and muscles of the lower lip; uniting with the mental nerve, it gives off also (9) *filaments* which descend downwards and forwards, beneath the platysma myoides, and unite with the ascending cervical nerves. All the motions of the face which accord with respiration depend on this nerve, and from its numerous anastomoses it has been called the small sympathetic nerve.

- |   |                                  |
|---|----------------------------------|
| (1) Nervus auricularis                      | (5) Nervi malares                |
| (2) Nervus digastricus et<br>stylo-hyöideus | (6) Nervi buccales               |
| (3) Nervus temporo-facialis                 | (7) Nervus cervico-facialis      |
| (4) Nervi temporales                        | (8) Nervus marginalis            |
|   | (9) Nervus subcutaneus<br>colli. |

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## NERVI AUDITORII.

*The Auditory Nerve, or Portio Mollis*, on each side arises from the bottom of the fourth ventricle, passes in company with the portio dura, to the bottom of the meatus auditivus internus, perforates the cribriform plate in a state of fibrillæ, and terminates in a semi-pellucid pulpy substance, expanded over the lining membrane of the vestibule, semi-circular canals, and cochlea of the internal apparatus of hearing. It is destined to the function of hearing.

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## NERVI RESPIRATORII GLOSSO-PHARYNGEI.

*The Glosso-pharyngeal Nerves* arise from between the corpora restiformia and corpora obliqua, below the portio dura, above the nervus vagus (*tractus respiratorius*.) Each nerve leaves the cranium through the

Foramen lacerum basis cranii, in a separate opening formed by the dura mater, and forms a small ganglion (*neuronodus petrosus*), from which is derived a branch which enters the tympanum (*ramus anastomoticus Jacobson*) and unites with the vidian, and a descending branch to the first ganglion of the great sympathetic. The nerve now continues its course downwards and inwards, over the internal carotid artery, first on the edge, then in front of the stylo-pharyngeus muscle, to the tongue. It sends branches upon the internal carotid, pharynx, tonsils, and to the tongue; is placed above the lingual nerve, under the true gustatory nerve. It communicates with the nervus vagus, stylo-hyoid branch of the facial, accessory, and great sympathetic nerves. The different actions of the throat, fauces and tongue, associated with respiration, are under the influence of this nerve.

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## NERVI RESPIRATORII PNEUMO-GASTRICI.

*The Pneumo-gastric Nerves* arise from the respiratory tract, between the corpora restiformia and corpora olivaria, by one or two rows of filaments, immediately beneath the preceding nerve. Each nerve leaves the cranium by the foramen lacerum basis cranii separated, from the internal jugular vein, by a process of bone, from the accessory and glosso-pharyngeal nerves by a band of the dura mater; passes down the neck, within the carotid sheath, between the carotid artery and internal jugular vein; enters the chest between the subclavian artery and vein, and continues its course through the posterior mediastinum with the œsophagus, through the diaphragm to the cardiac extremity of the stomach. The right nerve is placed rather behind the œsophagus; the left nerve rather in front. The right nerve crosses the subclavian artery at right angles; the left is anterior, but nearly parallel with the subclavian artery, and crosses obliquely the posterior surface of the arch of the aorta. Immediately after issuing from the cranium, the nerve expands, and from the appearance of a small ganglion, which is

filaments from the great sympathetic, glosso-pharyngeal, accessory, and lingual nerves. It first gives off the (1) *pharyngeal* nerve; it descends obliquely inwards, behind the internal carotid artery, and is distributed exclusively to the pharynx; it gives off branches which assist in forming with the glosso-pharyngeal, sympathetic, and accessory nerves, a remarkable plexus behind the pharynx—the *pharyngeal plexus*; (2) the *superior laryngeal* nerve, which runs downwards and forwards behind the internal carotid towards the side of the larynx, where it divides into external and internal branches; the former are distributed to the muscle of the larynx—the latter perforate the thyro-hyoid ligament, and are distributed to the muscle of the vocal ligaments, *anastomosing* with the recurrent laryngeal nerve. At the lower part of the neck, small branches (3) *superficial cardiac*, are sent off to join the cardiac plexus of the great sympathetic, behind the arch of the aorta. (4) Next, the *recurrent laryngeal nerve*:—this nerve offers some differences with respect to its course on either side of the neck. The right nerve bends upwards, winding around the subclavian artery, behind the carotid; the left nerve winds around the arch of the aorta. The two nerves continue their course upwards and inwards, behind the common carotids and inferior thyroideal arteries, by the side of the trachea to the larynx. In their course, they first give off *deep cardiac branches* to the cardiac plexus, filaments to the œsophagus, thymus gland, and pharynx; lastly, numerous branches to the crico-arytenoidei laterales et postici, arytenoidei, et thyro-arytenoidei muscles, and to the mucous membrane of the larynx. In the posterior mediastinum, the nerves give off filaments, constituting four plexusses; (5) the *anterior pulmonary*, distributed to the fore part of the bronchial tubes, and accompanying their ramifications in the substance of the lungs; (6) the *posterior pulmonary* winding along the posterior surface of these tubes; (7) the *smaller œsophageal*, distributed to the superior part of the œsophagus; lastly, the *greater œsophageal* which completely surrounds the œsophagus, and frequently forming small ganglia. In the abdomen the right nerve passes behind the cardiac orifice of the stomach, and is distributed to the posterior surface of this

viscus, giving branches to the greater and smaller curvature of the stomach, to the duodenum, and pancreas, communicating with the coronary and solar plexuses of the great sympathetic nerve. This distribution of the nerve, by some anatomists, has been described as the (9) *posterior œsophageal plexus*. The left nerve passes in front of the cardia, and bends along the smaller curvature towards the pylorus, is distributed to the anterior surface of the stomach, under the name of the (10) *anterior œsophageal plexus*, and freely communicates with the posterior and hepatic plexuses.

From the numerous communications of the pneumogastric nerves, they have sometimes been called the *middle sympathetics*.

- |   |                                  |
|---|----------------------------------|
| (1) Nervus pharyngeus                       | (6) Plexus pulmonalis posterior  |
| (2) Nervus laryngeus superior               | (7) Plexus œsophageus minor      |
| (3) Nervi cardiaci superficiales            | (8) Plexus œsophageus major      |
| (4) Nervus laryngeus inferior vel recurrens | (9) Plexus œsophageus posterior  |
| (5) Plexus pulmonalis anterior              | (10) Plexus œsophageus anterior. |

This nerve influences all the motions and functions of the parts to which it is distributed, connected with respiration. The voice depends importantly upon its influence; division of the laryngeal nerves is attended with loss of voice. Aneurism of the aorta, of the common carotid, enlarged thyroid, and lymphatic glands of the neck, from pressure on the recurrent laryngeal nerves more or less affect the tone of the voice.



## NERVI RESPIRATORII TRACHELO- DORSALES.

(*Nervi Accessorii.\** Willis.)

*The Respiratory Nerves of the Neck, or Accessory Nerves*, arise from the respiratory tracks, opposite the fourth cervical vertebræ; each nerve enters the cranium, by the foramen magnum, and almost immediately passes out of that cavity, by the foramen lacerum basis cranii, in company with the pneumo-gastric, and glosso-pharyngeal nerves; it continues its course behind the internal jugular vein, and perforates the upper third of the sterno-cleido-mastöideus muscle; is distributed to these muscles, platysma myöides, and integuments. It gives branches of communication at its exit from the cranium, to the great sympathetic, lingual, and pneumo-gastric nerves. The division of the spinal accessory nerve stops the respiratory motion of the mastoid and trapezius muscles in forced inspiration.

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## NRRVI MOTORES LINGUÆ.

*The Motory Nerves of the Tongue*, the ninth pair of some anatomists, arise from the corpus pyramidale (the continuation of the *tractus motorius*). Each nerve passes through the foramen condylöideum anterius, and continues its course forwards and inwards, behind the internal jugular vein, in front of the two carotids, beneath the digastricus muscle, above the os hyöides, in front of the hyo-glossus muscle, which separates it from the lingual artery, to the tongue, taking a direction inwards, forwards, and upwards, between the lingualis and genio-glossus muscles. In its course it describes an arch. It gives off numerous filaments to the muscles of the tongue, branches uniting with the great sympathetic,

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\* It is described by Gall and Spurzheim, as arising from the dorsal surface of the medulla spinalis, but admitting as we must do, the minute researches of these distinguished physiologists to be almost undoubted authority, I am convinced, from careful and repeated examination, of the accuracy of Bell's statement, that this nerve owes its origin to the respiratory track.

glosso-pharyngeal, pneumo-gastric, and fifth pair of nerves. From the convexity of the arch it gives off the *descendens noni*, which passes downwards, and inwards, in front of the carotid sheath, and is distributed to the sterno-hyoid, thyroid, and omo-hyoid muscles, uniting with branches from the phrenic nerve.

This nerve influences the motions of the tongue, and does not afford the sense of taste.

## NERVI INTO-THORACICI RESPIRATORII.

(*Nervi Phrenici*. Willis.)

*The Phrenic Nerves* are usually described as being derived from the fourth cervical nerves, receiving a branch from the third and the fifth; by Charles Bell their origin is derived from the *tractus respiratorius*. Each nerve first lies between the *scalenus anticus*, and *rectus capitis anticus major*, continues its course down the neck on the inner margin of that muscle, enters the chest between the subclavian artery and vein, descends through that cavity over the pulmonary vessels in front of the root of the lungs, between the pleura and lateral parts of the pericardium to the diaphragm. The right nerve passes nearly vertically; independently of supplying the diaphragm, it gives branches to the liver. The left nerve is the longer, and winds over the apex of the heart. The phrenic nerves are distributed to the diaphragm, and communicate with the great sympathetic and pneumo-gastric nerves. The respiratory action of the diaphragm depends upon the phrenic nerves. Injury of the spinal marrow, fracture and displacement of the cervical vertebræ above the fourth, generally proves a cause of instant death, from paralysis of the diaphragm. The immediate conjunction of the cervical nerves with the phrenic, may account for the remarkable contortions of the muscles of the neck in the disease termed *risus sardonius*.

## NERVI EXTO-THORACICI RESPIRATORII.

*The external Respiratory Nerves of the Chest* are described as the descending branches of the cervical plexus. I am inclined to believe with Bell that they owe their origin to the tractus respiratorius, and that the filaments of communication from the cervical nerves ought not to be considered as forming the commencement of these nerves. The external respiratory nerve, on either side, passes beneath the clavicle, in front of the axillary plexus to the external and lateral region of the thorax, and is distributed to the intercostals and serratus magnus muscles already minutely supplied by the intercostal branches from the dorsal nerves. The action of these muscles in difficult inspiration, results from the nervous influence derived from this important trunk.

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## OF THE SPINAL NERVES.

*The Medulla Spinalis*, in anatomical language, commences at the foramen magnum, passes down within the spinal canal, and in the young subject terminates on the last dorsal vertebræ, but in the adult generally on the second lumbar vertebra. The termination of the spinal marrow is surrounded by numerous nerves, proceeding from the extremity, and from its forming a resemblance to a horse's tail, it is termed the cauda equina.

The coverings of the medulla spinalis are three in number. The first is a firm, dense, tendinous structure, belonging to the class of fibrous membranes, and is termed the *theca vertebralis*; it does not adhere to the internal surface of the vertebral canal, a quantity of cellular tissue intervening between it and the bone. It possesses a slight degree of elasticity enabling it to adapt itself to the curvatures of the spine. The second is a thin, delicate, transparent membrane, polished and constantly moistened by a serous fluid; it belongs to the class serous membranes, and is termed the *tunica arachnoides*. The third is a loose, cellular, transparent web, composed of minute ramifications of blood vessels

connected together by cellular membrane, and is termed the pia mater.

The medulla spinalis is composed of two similar halves, divided by an anterior and posterior longitudinal sulcus, and united by a commissure, or apparatus of union. Each portion consists of three tracts, namely, tractus motorius, respiratorius, et sensitivus.

A transverse section of the medulla spinalis shews it to consist of a thin lamella of white matter enclosing the grey or cineritious substance. The cineritious substance presents two lateral portions, each of crescentic form; their concavities looking outwards, their convexities looking towards the middle line. The intimate structure of the grey substance is unknown; Rysch, Vieussens, and Haller regard it as a tissue of very fine blood vessels. Albinus and Sæmmering have proved by their injections, that, besides very minute blood vessels, there also exists a peculiar substance in the cineritious nervous mass. The second, or white, substance, is essentially fibrous. Some anatomists have maintained it to be solid; others have said that it was tubular; Sir E. Home, that it was composed of globules. The vessels of the medulla spinalis are on either side an anterior and posterior artery, derived from the vertebral; all the arteries in the neighbourhood of the spine send in branches through the intervertebral foramina. The veins are very remarkable; they do not present a continuous canal, but rather resemble a chain of short veins linked together: they terminate principally in two sinuses, sinus venosi, by the side of the foramen magnum.

The medulla spinalis is not of the same size throughout its course; it is expanded in the lower part of the cervical vertebræ, contracted in the dorsal, expanded in the lumbar vertebræ. The reason of these two expansions may be thus explained,—the nerves distributed to the upper extremity, come off from the lower part of the neck; those to the lower extremity, from the top of the loins.

*Of the Cervical Nerves.***NERVUS CERVICALIS PRIMUS.***(Première pair trachéenne. Chauss.)**(Nervus sub-occipitalis. Winslow.)**(Nervus decimi paris. Willis).*

The *first* pair of Cervical Nerves, or sub-occipital, arises by two roots from the anterior and posterior column of the medulla spinalis; the posterior filaments having formed the ganglion, are joined by the anterior. The nervous trunk, on either side, passes from the vertebral canal, between the os occipitis and atlas, and then divides into anterior and posterior branches. *The anterior branch* passes on the outer side of the vertebral artery, above the transverse process of the atlas, between the capitis lateralis and anticus minor: it gives off a descending branch, which is joined by an ascending filament from the second cervical, forming as it were, a loop embracing the atlas; branches to the rectus capitis lateralis, anticus major and minor muscles, and communicates with the great sympathetic, pneumo-gastric, and lingual nerves. *The posterior branch*, the largest, passes backwards into the triangular space between the obliqui and recti capitis postici muscles, and divides into three principal branches,—a superior, distributed to the recti and complexus; a second, to the obliquus capitis; and a third, which descends and joins the posterior branch of the cervical nerve.

**NERVUS CERVICALIS SECUNDUS.***(Par primus cervicalis. Willis.)*

The *second* pair of Cervical Nerves comes out between the atlas and the vertebra dentata. Each nerve immediately divides into two branches, an anterior and posterior: *the posterior branch* is the largest, and passes backwards behind the inferior oblique and complexus muscles, towards its internal margin, when it becomes

sub-cutaneous: it gives off branches to the muscles of the back of the neck, also to the integuments, and communicates with the sub-occipital, posterior aural, and cervical plexus. *The anterior branch* passes forwards, between the transverse processes of the first and second cervical vertebræ, and gives off the five following branches,—*one* joining the sub-occipital nerve; *a second* to the first cervical ganglion of the great sympathetic; *a third* which gives filaments to the rectus capitis anticus major, and joins the cervical plexus; *a fourth* to the pneumo-gastric nerve; *a fifth* descending and concurring to form the cervical plexus.

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### NERVUS CERVICALIS TERTIUS.

(*Par secundus cervicalis.* Willis.)

The *third* pair of Cervical Nerves, having emerged from the intervertebral foramina, divides into anterior and posterior branches. *The anterior branch* communicates with the second and fourth cervical nerves, with the superior and middle ganglia of the great sympathetic, and also gives off numerous filaments to the rectus capitis, anticus major and minor, and longus colli muscles. *The posterior branch* perforates the complexus and trapezius muscles, and becomes sub-cutaneous, and is distributed to the adjacent parts.

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### NERVUS CERVICALIS QUARTUS.

(*Par tertius cervicalis.* Willis.)

The *fourth* pair of Cervical Nerves emerges from the vertebral canal, between the third and fourth cervical vertebræ; *its anterior branch* communicates with the third and fifth cervical nerves, and with the great sympathetic; it also gives off a branch joining the ~~into-the~~ <sup>thoracic</sup> or phrenic, and assists in forming the ~~ce-~~ <sup>plexus</sup>. *The posterior branch* is distributed to the ~~plexus~~ <sup>plexus</sup>, and splenius muscles.

## NERVUS QUINTUS CERVICALIS.

(*Par Quartus Cervicalis.* Willis.)

The *fifth* pair of Cervical Nerves comes out between the fourth and fifth cervical vertebræ, its *anterior branch* communicates with the fourth and the sixth cervical nerves, with the phrenic and great sympathetic nerves; it gives off branches to the adjacent muscles, and contributes to form the axillary plexus; its *posterior branch* is distributed to the complexus, splenius, and trapezius muscles, and to the integuments and platysma myöides.

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## NERVUS SEXTUS CERVICALIS.

(*Par Quintus Cervicalis.* Willis.)

The *sixth* pair of Cervical Nerves comes out between the fifth and sixth cervical vertebræ, its *anterior branch* communicates with the neighbouring ganglia of the great sympathetic, and assists in forming the brachial plexus; its *posterior branch* is distributed to the muscles and integuments of the posterior cervical region.

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## NERVUS CERVICALIS SEPTIMUS.

(*Par Sextus Cervicalis.* Willis.)

The *seventh* pair of Cervical Nerves comes out between the sixth and seventh cervical vertebræ; its *anterior branch* joins the great sympathetic nerve, and sends off filaments to the adjacent parts; its *posterior branch* is distributed to the muscles, at the inferior part of the neck, and superior part of the back.

## NERVUS CERVICALIS OCTAVUS.

(*Par Cervicalis Septimus.* Willis.)

The *eighth* pair of Cervical Nerves comes out between the seventh cervical and first dorsal vertebræ, the *anterior branch* communicates with the great sympathetic nerve, and assists in forming the axillary plexus; the *posterior branch* is distributed to the adjacent muscles.

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### CERVICAL PLEXUS.

The anterior branches of the four superior cervical nerves form the cervical plexus, with filaments from the great sympathetic nerve. It lies upon the scalenus posticus, underneath the posterior margin of the sterno-cleido mastoideus muscle. It communicates with the superior and middle cervical ganglia of the great sympathetic nerve, and gives off numerous branches which may be arranged into (1) external, (2) internal (3) ascending, and (4) superficial.

- |                         |                               |
|-------------------------|-------------------------------|
| (1) Nervi externi colli | (3) Nervi ascendentes colli   |
| (2) Nervi interni colli | (4) Nervi superficiales colli |

*The External Descending Branches* are four or five in number and have been divided into (1) *supra clavi-  
cular branch*, which passes under the platysma myöides, on the lateral part of the neck, in front of the clavicle, and is distributed to the pectoralis major; (2) *sub-clavi-  
cular branch*, which descends between the trapezius, and sterno-cleido-mastoideus, underneath the clavicle, into the axilla, and is distributed to the omo-hyöideus subscapularis, and serratus magnus; (3) *super acromial  
branch* which passes along the inner margin of the trapezius, and is eventually distributed to the deltoid muscle; (4) *deep branches* to the trapezius, rhomböidei, levator anguli scapulæ muscles.



- (1) Nervus super-clavicularis      (3) Nervus supra acromialis  
 (2) Nervus sub-clavicularis      (4) Nervi superficiales colli

*The internal descending branches* pass inwards, underneath the sterno-cleido-mastoid muscle, and are distributed to the adjacent parts, and communicate with the lingual nerve.

*The ascending branches* have been divided into (1) mastoid, and (2) auricular branches; the former ascends on the posterior edge of the sterno-cleido-mastoideus, trapezius, and occipito frontalis; the latter, *the auricular branch* is reflected over the posterior branch of the sterno mastoid muscle towards the angle of the jaw; it divides into numerous filaments distributed to the parotid gland, to both surfaces of the auricle, to the meatus externus, and to the integuments; it communicates with the facial and inferior maxillary nerves.

- (2.) Nervus zygomatico-auricularis      (1.) Nervus occipito-auricularis

*The superficial branch* crosses the sterno-cleido mastoid muscle under the platysma myöides, and subdivides into ascending and descending branches distributed to the integuments and platysma myöides.

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## AXILLARY PLEXUS.

The Axillary Plexus is formed by the anterior branches of the cervical and first dorsal nerves; they pass downwards and outwards between the anterior and middle scalmi muscles, then beneath the clavicle and subclavius muscle into the axilla. In the neck the axillary plexus is placed above, and to the outer side of the subclavian artery, except the dorsal nerve, which is behind; lower down, the plexus completely surrounds the continued trunk of the artery. In the formation of the plexus, the filaments of the fifth and sixth cervical nerves unite and form a single cord; the eighth and first

dorsal, also, unite and form a trunk: the seventh cervical proceeds between the two, and divides into two cords, one of which is connected with both nerves. From the axillary plexus are derived the nerves of the superior extremity, namely—

- |                             |                                     |
|-----------------------------|-------------------------------------|
| 1. Nervi thoracici          | 6. Nervus minus internus cutaneus   |
| 2. Nervus scapularis        |                                     |
| 3. Nervus subscapularis     | 9. Nervus externus musculo cutaneus |
| 4. Nervus axillaris         | 8. Nervus medianus                  |
| 5. Nervus internus cutaneus | 7. Nervus radialis                  |
|                             | 10. Nervus ulnaris                  |

Before the above nerves are given off, small filaments are sent off to the great sympathetic and phrenic nerves.

1. *The thoracic nerves (nerfs sterno-thoraciques. Chauss.)* are two or three in number, and may be distinguished into anterior and posterior branches. The *anterior* branch arises from the seventh pair, receiving a filament from the eight and first dorsal; it divides into branches which pass in front and behind the clavicle, and are distributed to the subclavius and pectorales muscles, communicating with the intercostals and axillary nerves: the *posterior* branch comes off from the fifth and sixth pair, receiving a filament from the seventh, it passes behind the axillary vessels, and is distributed to the serratus magnus.

2. *The Supra-scapular Nerve* comes off from the fifth cervical nerve, it passes outwards, in company with the supra-scapular artery, to the coracoid notch of the scapula, enters the fossa supra spinata, beneath the coraco costöideum ligament, and is distributed to the spinate and teres minor muscles.

3. *The Sub-scapular Nerve or Nerves*, vary in number, are irregular in their origin, and are distributed to the subscapularis, teres major, and latissimus dorsi muscles.

4. *The Axillary, or Circumflex Nerve (nerf. scapulo-humeral. Chauss.)* arises from the two last cervical nerves, and first dorsal; it winds outwards over the subscapularis, in company with the posterior circum-

artery, beneath the triceps, above the insertion of the *teres major*, and *latissimus dorsi*, and divides into filaments distributed to the deltoid and *infra spinatus* muscles. In dislocation of the head of the humerus, into the axilla, this nerve is sometimes compressed, producing paralysis of the deltoid, and consequently want of power to raise the arm.

5. *The Internal Cutaneous Nerve (nerf. cubito-cutané. Chauss.)* arises from the eighth cervical, and first dorsal nerve, and passes down under the brachial aponeurosis, on the inner side of the fore-arm, parallel to the basilic vein; as it descends it becomes more superficial, and about the middle of the arm divides into two branches external and internal. (1) The *external branch*, the smallest, pierces the brachial aponeurosis, continues its course on the inner edge of the biceps, over the middle of the bend of the arm, and may be traced between the integuments, and anti-brachial fascia, as far as the wrist. It communicates with the musculo-cutaneous and spiral nerves, and usually passes at the bend of the elbow, behind the medium basilic vein, sometimes in front (2) The *internal branch*, the largest, accompanies the basilic vein, and above the inner condyle divides into two branches; one passes obliquely over the anterior muscles of the fore-arm, and is distributed to the integuments, on the inner and anterior part, as far as the wrist, the other passes behind the inner condyle, and continues its course beneath the integuments posteriorly, and may be traced to the dorsum of the hand, and to the little finger. These branches communicate with the ulnar nerve.

(1) *Ramus externus*

(2) *Ramus internus*

6. *The internal cutaneous nerve of Wrisberg* is a small filament, passing on the inner side of the preceding nerve, and is distributed to the integuments covering the triceps.

7. *The external cutaneous nerve (nervus musculo-cutaneus. Sæmen. Nerf radio cutané. Chauss)* arises from the fifth and sixth cervical, and joins by a filament the median nerve: it passes outwards and downwards between the *coraco-brachialis*, and continues its

at this point it is situated between the integuments and tendons of the extensor ossis metacarpi pollicis, and *primi internodii*: the *external branch* is distributed to the inner margin of the thumb, and outer margin of the fore finger; the *internal branch* supplies the inner margin of the fore finger, and external margin of the middle finger, and communicates with the ulnar nerve. The superficial and digital branches in their course give off filaments to the adjacent muscles. (3) *The posterior or deep branch* directs itself obliquely outwards beneath the supinator longus and radial extensors, and divides into branches distributed to the muscles; one branch in particular (*external interosseal nerve*) accompanies the posterior interosseal artery, and may be traced beneath the annular ligament to the back part of the carpus.

- |                         |                          |
|-------------------------|--------------------------|
| (1) Nervus cutaneus me- | (2) Nervus superficialis |
| dius                    | (3) Nervus profundus     |

10. *The Ulnar Nerve (nerf cubito-digital. Chauss.)* arises from the two last branches of the brachial plexus; it descends along the anterior and inner part of the triceps muscle, behind the inner condyle, between the two origins of the flexor carpi ulnaris, and continues its course on the inner side of the ulnar artery, along the anterior and inner part of the fore arm, between the flexor carpi ulnaris and flexor profundus. In its course it gives off branches to the triceps, integuments of the fore arm, to the deep and superficial flexor muscles, and communicates by a slender filament with the median nerve. The ulnar nerve, about an inch and a half above the wrist joint, divides into two branches the palmar and dorsal nerves. (1) *The palmar nerve* may be considered the continued trunk; it passes into the palm of the hand on the outer margin of the os pisiforme, between the integuments and annular ligament, and divides into *deep and superficial branch*. The *deep branch* passes beneath the adductor minimi digiti, and bends towards the root of the metacarpal bone of the fore finger, beneath the flexor tendons, forming an arch, from which numerous filaments pass to the lumbricales, interossei, and adductor muscles of the thumb:

the *superficial branch* gives off twigs to the muscles of the little finger, and inner margin of the ring finger. (2) The *dorsal nerve* winds around the ulna to the back of the carpus, beneath the tendon of the flexor carpi ulnaris, and is distributed to the integuments of the carpus, and gives off branches to both sides of the little finger, ring finger, and ulnar side of the middle finger, communicating with the radial nerve.

(1) *Nervus palmaris*

(2) *Nervus dorsalis*

### *Of the Dorsal Nerves.*

The Dorsal Nerves are twelve in number, and are designated by their numerical names, counting from above downwards; they arise by double roots, possess ganglia, and are endowed with the double function of sensation and voluntary motion. Emerging from the intervertebral foramina, each nerve divides into two branches—a posterior, or *dorsal*, and an anterior, or *intercostal*. The *posterior branches*, the smallest, pass backwards between the transverse processes of the dorsal vertebræ, under the semi-spinalis, and are distributed to the muscles and integuments of the back and loins. The *anterior branches* communicate with the great sympathetic nerve, with each other, and are distributed to the muscles of the fore arm, mammæ, fore and lateral parts of the chest, diaphragm, and to the abdominal and lumbar muscles.

### NERVUS DORSALIS PRIMUS.

The *anterior branch* is the largest, and communicates with the great sympathetic nerve, and divides into two filaments—a *superior*, which unites with the eighth cervical nerve and assists in forming the axillary plexus, and an *inferior*, which runs along the under edge of the first rib; the *posterior branch* is small, and communicates with the cervical nerves.

di. ti. ti. ti. ti. mi. vi. ni. mi. mi. mi.

**NERVI 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 DORSALES**

*The anterior branches* communicate with the great sympathetic nerve, are lodged in the grooves in the lower margins of the corresponding ribs, beneath the pleura, between the two layers of intercostal muscles, and are reflected upon the intercostal and mammary arteries; they vary in their distribution. *The posterior branches* run backwards between the transverse processes, and divide into internal and external filaments; the former are distributed to the muscles occupying the vertebral grooves; the latter to the latissimi dorsi, trapezii, serrati postici, rhomböidei muscles, and to the integuments.

*The anterior branches of the second and third dorsal nerves* give off the *intercosto-humeral branch*, which perforates the external intercostal muscle, crosses the axilla, and descends along the inner surface of the arm beneath the integuments as far as the elbow.

*The anterior branches of the fourth, fifth, sixth and seventh dorsal nerves*, about the middle of the ribs, divide into external and internal filaments: the former are distributed to the external oblique muscles and integuments of the abdomen; the latter to the pectoral muscles, mammæ, and to the integuments of the thorax.

*The anterior branches of the eighth, ninth, tenth, and eleventh dorsal nerves*, at the anterior third of the ribs, separate into two sets of filaments—*external*, which are distributed to the serrati magni, external oblique muscles, and to the integuments of the lateral parts of the chest and abdomen; and *internal*, which supply the intercostal spaces and abdominal muscles.

*The anterior branch of the twelfth dorsal nerve* first gives off filaments of communication with the great sympathetic and first lumbar nerves, small twigs to the diaphragm and quadrati lumborum muscles, and then divides into an *external branch*, which is distributed to the oblique muscles and integuments of the abdomen; and an *internal branch*, supplying the internal oblique, transversales, recti, and pyramidales muscles.

### *Of the Lumbar Nerves.*

The Lumbar Nerves are five in number ; they arise from the lower part of the medulla spinalis, by double roots, and constitute, with the sacral nerves, the *corda equina*. The posterior roots having expanded into ganglia, in the intervertebral foramina, are then joined by the anterior filaments, the trunk thus formed, immediately divides in *anterior branches (rami abdominales)* and *posterior branches (rami lumbales)*.

The *posterior branches* pass backwards, between the transverse processes of the lumbar vertebræ and are distributed to the muscles and integuments of the loins, and to the integuments of the upper and back part of the thigh. The *anterior branches* communicate with each other, with the twelfth dorsal, first sacral, and great sympathetic nerves, and their union constitutes the *lumbo abdominal plexus*.

### NERVUS LUMBALIS PRIMUS.

The *anterior branch of the first Lumbar Nerve* receives a branch from the last dorsal, and sends a filament to the great sympathetic and second lumbar nerves ; it gives off the *inguinal nerves (nerfs inguino-cutanés. Chauss.)* generally three in number. (1) The *superior inguinal (nerf ilio-scrotal. Chauss.)* runs obliquely outwards in front of the psoas magnus, and quadratus lumborum muscles to the posterior part of the crista of the ileum, where it divides into two branches, *external* and *internal*, the former is distributed to the muscles of the abdomen, the latter continues its course, first along the inner border of the crista of the ileum, then along the under margin of Poupart's ligament, through the external ring, and is distributed to the scrotum in the male, and labia pudendi, in the female. (2) The *middle branch, (nerf inguino-cutané)* crosses the psoas magnus, passes obliquely along its external border, beneath the peritoneum to the anterior superior spinous process of the ileum ; in its course it gives off filaments to the psoæ, quadratus, lumborum, iliacus internus mus-





## NERVUS LUMBALIS TERTIUS.

*The anterior branch of the third Lumbar Nerve, communicates with the preceding nerves, with the great sympathetic, and assists in forming the lumbar plexus. The posterior branch is distributed to the integuments and muscles of the loins.*

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## NERVUS LUMBALIS QUARTUS.

*The anterior branch of the fourth Lumbar Nerve communicates with the preceding, and with the lumbar ganglia of the sympathetic, and joins the lumbar plexus. The posterior branch supplies the muscles and integument of the loins.*

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## NERVUS LUMBALIS QUINTUS.

*The anterior branch of the fifth Lumbar Nerve communicates with the preceding nerves, with the neighbouring ganglia of the great sympathetic, and assists in forming the lumbar plexus ; it gives off the *sacro-lumbar*, which descends into the pelvis, in front of the sacrum, and unites with the great sciatic plexus, previously sending off the *superior gluteal nerve*, which leaves the pelvis above the pyriformis muscle, and is distributed to the gluteus medius, and minimus, and to the fascia lata.*

*The posterior branch of the fifth Lumbar Nerve is distributed to the sacro spinalis, and multifidus spinæ muscle.*

## PLEXUS LUMBO-ABDOMINALIS.

(*Portio lombaire du plexus crural.* Chauss.)

The Lumbar Plexus is formed by the union of the anterior branches of the five lumbar nerves, receiving filaments from the last dorsal, first sacral and great sympathetic nerves on the sides of the bodies of the second, third, and fourth lumbar vertebræ, in front of the transverse processes behind the psoas magnus muscle. It gives off, having furnished filaments to the psoæ and iliacus internus muscles, the following nerves:\*

1. Nervi crurales

2. Nervi obturatores

*The anterior Crural Nerve (nerf femoro-prætibial.* Chauss.) is formed by the anterior branches of the four nerves, beneath the psoas magnus; it descends on the outer border of that muscle, beneath Poupart's ligament, on the iliac side of the femoral vessels, and divides into *superficial or cutaneous branches*, and *deep or muscular branches*; in its course it gives off filaments to the iliacus internus muscle. (1) *The superficial branches* perforate the fascia, and are distributed to the integument, and accompany the saphena vein: (2) *the deep branches* are divided into two sets, *external* and *internal*; the former supply the extensor muscles and tensor vaginae femoris; the latter are distributed to the adductors, gracilis, pectineus, and sartorius muscles; one branch in particular, (3) *nervus saphenus, (nerf tibio cutané.* Chauss.) accompanies the femoral artery on the outer margin of its sheath till that vessel passes between the adductor muscles into the popliteal space: the nerve then continues its course beneath the sartorius, behind the inner condyle, and, becoming subcutaneous, accompanies the saphena vein and its branches on the inner and fore part of the leg, and is eventually distributed to the dorsum of the foot.

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\* By some anatomists the plexus is described as giving off the following nerves, already described.

1. Nervi inguinales

3. Nervi crurales

2. Nervi cutanei externi

4. Nervi obturatores

5. Nervi lumbo-sacrales.

- |                     |                      |
|---------------------|----------------------|
| (1) Nervi cutanei   | (2) Nervi musculares |
| (3) Nervus saphenus |                      |

*The Obturator Nerve (nerf sous pubio-femoral.—Chauss.)* is derived from the second, third, and fourth lumbar nerves, and is situated between the psoas magnus and last lumbar vertebra; it descends along the inner margin of that muscle, and continues its course in front of the brim of the pelvis in company with the obturator artery, to the opening in the thyroideal ligament. It divides into internal branches, supplying the obturator internus, levator ani muscles, and external branches to the obturator externus, gracilis, pectinalis, and adductor muscles, which communicate with the muscular branches of the anterior crural nerve.

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### *Of the Sacral Nerves.*

*The Sacral Nerves* are five or six in number; they arise from the termination of the medulla spinalis, possess double roots, ganglia, and assist in forming the corda equina: they follow an oblique course to the foramina of the os sacrum, and divide into anterior and posterior fasciculi. *The posterior branches*, the smallest, communicate with the lumbar nerves, and are distributed upon the back part of the sacrum to the gluteal muscles and to the integuments; *the anterior branches* are united with each other, and with the ganglia of the great sympathetic nerve.

*The anterior branches* of the first, second, and third sacral nerves, with the two last lumbar, form the sciatic plexus. From the anterior branches of the third and fourth, filaments are sent to the hypo-gastric plexus: lastly, the anterior branches of the fifth and sixth are distributed to the coccygeus, sphincter, and levator ani muscles.

## PLEXUS SACRALIS.

(*Portio sacrée du plexus crural. Chauss.*)

*The Sacral, or Sciatic Plexus*, formed by the anterior branches of the two last lumbar, and three or four first sacral nerves, is situated on the anterior and lateral part of the sacrum, in front of the pyramidalis muscle, behind the hypogastric vessels, bladder and rectum, and communicates above with the lumbar, below with the hypogastric plexuses.\*

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 NERVUS SACRALIS PRIMUS.

*The anterior branches of the first Sacral Nerve* unite with filaments from the two last lumbar and form the sacro lumbar nerve, from which is derived the superior gluteal branch already described; the posterior branch communicates with the lumbar filaments, and is distributed to the back of the sacrum: the *posterior branch* is distributed to the glutæi muscles and integuments.

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 NERVI SACRALES SECUNDI ET TERTII.

*The anterior branches of the second and third Sacral Nerves* send off from the back part (1) *the inferior gluteal*, (*nerf petit femoro-poplité. Chauss.*) and (2) *pudic nerve* (*nerf ischio-penien. Chauss.*)

- (1) Nervus glutæus inferior    (2) Nervus pudendo hæ-  
morrhoidalis

*The inferior gluteal nerve* leaves the pelvis by the

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\* By some anatomists the sacral plexus is considered to give off

- |                                 |                      |
|---------------------------------|----------------------|
| 1 Nervus glutæus inferior       | 5 Nervi vesicales    |
| 2 Nervus pudendo hæmorrhoidalis | 6 Nervi uterini      |
| 3 Nervus femoro-cutaneus        | 7 Nervi vaginales    |
| 4 Nervi hæmorrhoidales medii    | 8 Nervus ischiadicus |

sciatic notch below the pyriformis muscle ; it sends off (1) *muscular branches* to the glutæi, (2) *sciatic branch*, (*nerf cutané sous pelvienne* Chauss.) which passes beneath the tuberosity of the ischium, and is distributed to the perineum, urethra, integuments of the penis and scrotum in the male, to the labia pudendi in the female, (3) *crural branch* (*nerf femoro cutané posterior*,) which descends beneath the fascia lata along the posterior part of the thigh, as far as the popliteal space, where, perforating the fascia, it divides into subcutaneous branches and may be traced beneath the integuments as far as the heel.

- (1) Nervus glutæus medius et inferior
- (2) Nervus pudendalis longus inferior
- (3) Nervus femoro-cutaneus posterior.

*The Pudic Nerve* passes out of the pelvis, below the pyriformis muscle, re-enters that cavity between the two sacro-sciatic ligaments, in company with the internal pudic artery, and divides into two branches, superior and inferior. (1) The superior branch ascends along the ramus of the ischium and pubis, to the symphysis, continues its course along the dorsum of the penis, (*nervus dorsalis penis*) and is distributed in the male to the integuments of the penis, to the bulb, urethra, and glans ; to the labia pudendi, clitoris, and mons veneris in the female. (2) The inferior branch (*nerf hæmorrhoidal inférieur*. Chauss.) runs upwards between the accelerator urinæ, and erector penis, along the perineum, and supplies the muscles of the perineum, inferior extremity of the rectum and scrotum in the male, the labia pudendi in the female.

- (1) Nervus pudendus superior
- (2) Nervus hæmorrhoidalis inferior.

*The posterior branches of the second and third Lumbar Nerves* are distributed to the glutæi muscles, and to the integuments of the hip and margin of the anus.

## NERVI SACRALES TERTII ET QUARTI.

*The anterior branches of the third and fourth Sacral Nerves* give off the (1) *middle hæmorrhoidal nerves* (*nerf hæmorrhöidaux moyens*. Chauss.) to the sigmoid flexure of the colon, rectum, sphincter, and levator ani muscles. (2) *Vesical nerves* to the bladder, prostate gland, and vesiculæ seminales; in the female (3) *uterine and vaginal branches* to the fundus, body, and neck of the uterus, and to the lateral parts of the vagina.

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| (1) Nervi hæmorrhoidales<br>medii | (3) Nervi uterini et vagi-<br>nales |
| (2) Nervi vesicales               |                                     |

*The posterior branches of the third and fourth Sacral Nerves*, are precisely similar in their distribution to those of the preceding nerves.

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## NERVI SACRALES QUINTI ET SEXTI.

*The anterior branches of the fifth and sixth Sacral Nerves* pass between the sacrum and os coccygis, and do not enter into the formation of the sciatic plexus, and are distributed as already described; the *posterior branches* lose themselves around the anus.

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## NERVUS ISCHIADICUS.

(*Nerf grand femoro-poplité*. Chauss.)

*The great Sciatic Nerve*, considered by some anatomists as the continuation of the great sciatic plexus, descends in front of the pyramidalis muscle, leaves the pelvis between it and the superior gemellus, through the great sciatic notch; sometimes it perforates the pyramidalis. On emerging from the pelvis, it passes obliquely outwards, along the posterior part of the thigh, first below the tuber ischii and trochanter major,

behind the small rotators; it is then situated *superiorly* in front of the glutæus maximus, afterwards in front of the long head of the biceps and semitendinosus; at the lower part of its course the former muscle is placed on its outer side, the latter with the semitendinosus on its inner. About the inferior third of the thigh it divides into two branches, (1) *an external* (2) *and internal*. In its course it gives off small branches to the scrotum of the male, and to the labia of the female, to the flexor and adductor muscles; (3) *a few cutaneous branches* to the integuments of the posterior part of the thigh.

- (1) Nervus peroneus                      (2) Nervus tibialis  
(3) Nervi cutanei inferiores.

(2) *The external branch*, fibular, peroneal nerve, (*branche péronière du grand femoro-poplitée*. Chauss.) the smaller, passes obliquely outwards, with the tendon of the biceps behind the outer condyle, to the posterior surface of the head of the fibula, where it divides into two branches, the musculo-cutaneous and the anterior tibial. Before its division, it gives off (1) *articular branches*, distributed to the knee joint; (2) *cutaneous branches* which descend beneath the integument along the outer part of the leg, and join the external saphenus nerve.

(3) *The musculo cutaneous branche (nerf prætibio digital*. Chauss.) runs obliquely inwards and forwards, between the peroneus longus and extensor longus digitorum; at the inferior third of the leg it pierces the aponeurosis, and divides into two branches, *external and internal*; the former is distributed to the three outer toes, the latter to the great toe and inner side of the second toe.

(4) *The anterior tibial nerve (nerf prætibio sous plantaire*. Chauss.) passes between the peroneus longus and common extensors of the toes, and descends in company with the anterior tibial artery before the interosseous ligament, passes under the anterior annular ligament, and divides into two branches distributed to the interossei muscles, extensor brevis and integuments. In its course it gives off muscular branches to the tibialis anticus, peronei, and extensor muscles, and tibio tarsal articulation.

- |                          |                             |
|--------------------------|-----------------------------|
| (1) Rami articulares     | (3) Rami musculo-cutanei    |
| (2) Rami peroneo-cutanei | (4) Nervus tibialis anticus |

*The internal branch, Posterior Tibial (branche tibiale du nerf femoro-poplitée. Chauss.)* descends nearly vertically from the superior part of the popliteal space, to the arch of the os calcis; it first passes between the heads of the gastrocnemii, behind the knee joint and popliteus muscle, and continues its course on the outer side of the posterior tibial artery, between the solæus and tibialis posticus, and flexor longus digitorum, covered by the deep fascia; at the lower part of the leg it becomes more superficial, and passes into the hollow of the os calcis, where it divides into two branches, external and internal plantar nerves. In its course it gives off the (1) external saphenous nerve (*nervus communicans tibiæ*. Scæmmer.) which descends beneath the integuments, in company with the saphena minor vein, and about the middle of the leg is joined by a branch (*nervus communicans fibulæ*) from the fibular nerve; these two nerves unite and form a single trunk (*nervus dorsalis pedis externus*) which descends along the external margin of the tendo Achilles, behind the outer malleolus, along the external margin of the foot, and divides into two branches communicating with the external filaments of the musculo-cutaneous nerve and distributed to the two outer toes. (2) *Muscular branches* to the gastrocnemii, deep-seated muscles of the posterior region of the leg. *Malleolar branches* to the tibio-tarsal articulation and to the integuments. (3) The *external plantar* nerve is the smallest, it passes forwards and outwards, between the flexor brevis, and flexor accessorius, and divides into two branches, superficial and deep; the former is distributed to the flexor brevis minimi digiti, fourth lumbricalis, and to both sides of the little toe, and outer side of the fourth toe; the latter supplies the adductor pollicis, and interossei muscles. (4) The *internal plantar nerve* runs directly forwards, on the side of the tendon of the flexor longus pollicis, above the abductor pollicis, having given off numerous small filaments to the flexors of the toes, divides into four branches; the *first* supplies the inner margin of the great toe; the *second* its external margin, and inner



margin of the second toe; the *third* the outer margin of the second toe, and inner margin of the third toe; the *fourth* the external margin of the fourth toe.

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| (1) Nervus saphenus exter-<br>nus | (3) Nervus plantaris ex-<br>ternus |
| (2) Rami musculares               | (4) Nervus plantaris in-<br>ternus |

### *Of the Nerves of Organic Life.*

## NERVI VITÆ ORGANICÆ, NERVI VITALES, NERVI VITÆ GANGLIONICI.

(*Nervi intercostalis. Vicuss.*)

(*Nerf tri-splanchnique. Chauss.*)

(*Nerfs des ganglions ou de la vie organique. Bichat.*)

The action of the heart, the stomach, and intestinal canal is wholly independent of the will, and influenced by the nerves of organic life.

The honour of pointing out this important distinction has been assumed by Bichat,\* but he has no claim to it. Johnstone,† by a series of accurate experiments and ingenious deductions, inferred and brought forwards the uses of this system in the Philosophical Transactions for the year 1764, which were translated into French by Tissot,‡ in his *Traité des Maladies Nerveuses*, a long time previous to the appearance of Bichat's work on General Anatomy. A translation of the same disquisitions was published in German by Kolpin,§ at Stettin, in 1787; and the same opinions were adopted by Casi-

\* "Aucun anatomiste n'a encore considéré le système nerveux des ganglions sous le point de vue sous lequel je vais le présenter."—*Anatomie générale par Xan Bichat*, 1801.

† "May we not reasonably conclude that ganglions are instruments by which the motions of the heart and intestines are, from the earliest periods of animal life, rendered uniformly involuntary, and that this is their use? and is it not probable that ganglions have some important use in secretion."—*Disquisitions on the Nervous System*, by James Johnstone, M.D. 1764.

‡ *Traité des nerfs et de leur maladies* par Tissot.

§ Versuch über den Nutzen der Nervenknotten, Von James Johnstone, Stettin, 1787.

mir,\* at Mannheim, in 1774. I have been led to these remarks by a statement made by Dr. Cooke,† in his work on this subject, "that new views of the relative powers of the different parts of the nervous system, and supported by ingenious and accurate experiments, had been taken by Bichat." Charles Bell,‡ in his valuable work on the nervous system, remarks, "that according to Bichat, the ganglionic system of nerves is for those thousand secret operations of the living body, which may be called constitutional," the precise reasoning and conclusions of Johnstone.

In the head, on the anterior part of the neck, in the thoracic and abdominal cavities are a series of nervous communications, termed ganglia, and these constitute a secondary centre of nervous influence. The ganglia are generally of a reddish hue, very distinct from that of the nerves, sometimes rather grey. In texture they are found to have no resemblance to the cerebral substance, nor to that enclosed within the tubes of the nerves. By modern anatomists they are described to be composed of an infinite number of thin, white, medullary filaments, which interweave with each other, and of a reddish-grey, pulpy substance, differing from the grey matter of the encephalo spinal mass, and deposited in a kind of areolar tissue. The nervous filaments which arise from the ganglia, do not appear to be a continuation of their substance; according to Cloquet, some of these filaments are white, composed of fibrils, like the encephalic nerves, and are surrounded with a neurilemma; others are reddish, or grey, and are destitute of this coat. The ganglia are minutely supplied with blood vessels from the neighbouring arteries. Lymphatic vessels are distributed around the ganglia, but do not enter into their substance. The ganglia freely *anastomose* with the neighbouring nerves, and lose themselves in the tissues of organs. Various opinions have been advanced with respect to their functions. Meckel, Scarpa, Haase, and Zinn, have considered them as organs merely destined to collect and distribute the nerves

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\* Haller de Hist. Anat. 2 vols. p. 666.

† Treatise on Nervous Diseases, by John Cooke, M.D., p. 26, 1820.

‡ The Nervous System of the Human Body, by Charles Bell, p. 11, 1824.

of the ganglionic system. Johnstone conceives that the different parts of the sympathetic nerves are the sources of nervous influence, upon which circulation, secretion, absorption, and the varied functions of the viscera depend, and that the ganglia are laboratories of the nervous energy. This opinion has been adopted by Winslow, Monro, Vieussens, Barthez, Lobstein, and advocated warmly, without acknowledgement by Bichat, and may also be conceived to be the received opinion of the present day. The nervous energy is supposed to be diffused by the cellular tissue, in which the very minute branches of the sympathetic nerves are lost.

By anatomists of this country, the ganglionic system has been usually described as commencing in the carotid canal, by the vidian nerve, uniting with two or three branches from the sixth pair; it is, however, a system distinct, and independent of the nerves proceeding from the brain and medulla spinalis. It may be divided into cranial, cervical, thoracic, and abdominal portions, presenting a continuous trunk, formed by filaments of communication with the different ganglia.

The ganglia have been divided by Bichat, into those of the head, neck, chest, abdomen, and pelvis.

The ganglia of the head are the ophthalmic, the sphenopalatine, cavernous, naso-palatine, and sub-maxillary.

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### OPHTHALMIC GANGLION.

*The Ophthalmic, or Lenticular Ganglion*, is extremely small, of a reddish colour, of a quadrangular shape, situated at the posterior part of the orbit, on the outer side of the optic nerve; *superiorly* and *posteriorly*, it communicates by filaments with the nasal nerve (branch of the ophthalmic division of the fifth pair), *inferiorly* with the third pair; *anteriorly* it gives off the ciliary nerves.

The ciliary nerves are of a reddish colour, are accompanied by filaments from the nasal nerve, and divide into two sets, superior, and inferior; the former pierce the sclerotic, above the optic nerve, the latter beneath; both sets divide into numerous filaments, and form a

plexus around the ciliary body. Johnstone is enclined to attribute the involuntary motion of the iris, to the influence of this ganglion.

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## THE SPHENO-PALATINE GANGLION.

*The Spheno-palatine, or Mekel's Ganglion*, is situated in the pterygo-maxillary fossa, of a reddish colour, of a triangular shape, it gives off the superior (A), inferior (B), internal (C), and posterior branches (D).

- |                           |                                     |
|---------------------------|-------------------------------------|
| (A) Nervus anastomoticus  | (D) Nervus vidianus, ( <i>nervi</i> |
| (B) Nervus palatinus      | <i>quinti paris recurrens,</i>      |
| (C) Nervi spheno-palatini | <i>vel nervus pterygoideus)</i>     |

(A) *The Superior Branches* are two in number, and join the superior maxillary nerve, the second division of the fifth pair.

(B) *The Inferior Branches, the Palatine Nerves*, descend to reach the posterior palatine canal, and are distributed by numerous branches to the mucous membrane of the mouth, and nares, and anastomose with the naso-palatine ganglion.

(C) *The Internal Branches, spheno-palatine nerves*, pass inwards by the spheno-palatine foramen, into the nasal fossæ, are distributed to the investing membrane of the spongy bones, and septum narium, one branch in particular, called by Scarpa, the naso-palatine nerve, descends along the septum narium, to the upper opening of the anterior palatine canal, where, uniting with its fellow, it forms the naso-palatine ganglion, communicating with the palatine nerves.

(D) *The Posterior Branch, the Vidian, Pterygoid, or Recurrent Branch of the fifth pair of Mekel*, passes backwards along the pterygoid canal, to the foramen lacerum anterius, and divides into two branches, a superior and an inferior. In its course it gives filaments to the sphenoidal sinuses (1), to the superior and posterior part of the pharynx (2), and small twigs to the posterior nares (3). *The superior branch (nervus petrosus superficialis)* (4) enters the hiatus Fallopii, and divides

into two filaments, a superior and an inferior; the former joins the portio dura of the seventh pair of nerves, in the aqueduct of Fallopius, and form a little ganglion, from which is sent off a small twig, which accompanies the portio dura along that canal, and eventually leaves the cavity of the tympanum, by the fissura Glasseri, under the name of *corda tympani*; the inferior filament descends along the promontory of the tympanum, and unites with the carotid plexus, with the glosso-pharyngeal plexus, by means of the nerve of Jacobson, and with the superior cervical ganglion of the great sympathetic nerve. *The inferior branch of the vidian nerve (nervus petrosus inferior) (5) passes into the carotid canal, joins the cavernous, superior ganglion of the great sympathetic, and sixth pair of nerves.*

## GANGLION MEKELII.

### *First Branch, (A)*

Nervus anastomoticus superior—joins the superior maxillary nerve.

### *Second Branch, (B)*

Nervus palatinus gives off	Nervus palatinus major Nervi palatini minores Nervi nasales posteriores medii, et inferiores
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### *Third Branch, (C)*

Nervus speno-palatinus gives off	Nervi nasales medii Nervi nasales posteriores Nervi nasales anteriores
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### *Fourth Branch, (D)*

Nervus vidianus gives off	(1) Nervi sphenöïdales (2) Nervus pharyngeus of Bock (3) Nervi nasales posteriores et superiores (4) Nervus petrosus superficialis Corda tympani (5) Nervus petrosus inferior
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## THE CAVERNOUS GANGLION

*The Cavernous Ganglion* is placed within the cavernous sinus, situated on the outer side of the internal carotid artery; it communicates with the ophthalmic ganglion, with the superior cervical, with the ophthalmic and sixth pair of nerves.

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## THE NASO-PALATINE GANGLION.

*The Naso-palatine Ganglion* was discovered by Cloquet, is placed in the anterior palatine foramen, of remarkable firm texture, of an ovoid shape, and is joined by the two naso-palatine branches, and by the palate nerves.

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## THE SUB-MAXILLARY GANGLION.

*The Sub-maxillary Ganglion* is formed beneath the base of the jaw, on the sub-maxillary gland, by the corda tympani, and lingual nerve; its filaments accompanies the glandular branches of the facial artery. A small ganglion has been described by Ribes, as situated on the branch of communication of the anterior cerebral arteries, and another on the superficial temporal artery.

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## OF THE CERVICAL PORTION AND CERVICAL GANGLIA.

The continued trunk\* of the great sympathetic, extends from the base of the cranium, to the upper part of the thorax, in front of the rectus capitis anticus major, behind the carotid sheath, and presents three ganglions, superior, middle, and inferior.

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\* I adopt the word trunk in order to facilitate our description of the course and situation.

*The Superior Ganglion (ganglion cervicale magnum, ganglion olivare)* is of remarkable size, of an ovoid shape, of an olive tint, extending from the posterior opening of the carotid canal, to the transverse process of the third cervical vertebræ; it lies upon the rectus capitis anticus major, behind the internal carotid artery, internal jugular vein, par vagum, and ninth pair of nerves, and gives off *superior, inferior, external, internal, and anterior* branches.

*The superior branches* ascend, enter the carotid canal, and form a plexus upon the artery, from thence filaments proceed, which *anastomose* with the sixth pair, with the inferior branch of the vidian, with the nasal branch of the ophthalmic, and with a filament from the glosso-pharyngeal nerve; numerous filaments also accompany the carotid artery and its divisions; by these branches communication is established between the ophthalmic, spheno-palatine, cavernous, Ribes's ganglia, the retina, and the iris.

*The inferior branch* descends behind the carotid artery, in front of the rectus capitis anticus, and joins the middle ganglion; in its course it gives off filaments to the *superficial cardiac nerve*, to the pharynx, larynx, thyroid gland, and communicates with the laryngeal nerve.

*The external branches* are three or four in number; they cross the rectus capitis anticus major, communicate with the three superior cervical nerves, and are distributed to the adjacent muscles.

*The internal branches* vary in number, are remarkably small; they are distributed to the larynx, pharynx, and freely unite with the pneumo-gastric, glosso-pharyngeal nerves, and assist in forming the pharyngeal plexus.

*The anterior branches* are numerous, of a red colour, and soft consistence, and have been termed *nervi molles*. They anastomose with the nervus vagus, facial, ninth pair of nerves, and glosso-pharyngeal nerves, and form a plexus around the common carotid, from whence filaments proceed, which accompany in a radiated direction all the branches from the internal carotid artery; one branch descends, the *superficial cardiac*

nerve,, on the outer side of the common carotid, and communicates with the descendens noni, and recurrent laryngeal nerves.

*The middle ganglion, (ganglion cervicale medium, ganglion thyroideum)* is frequently wanting; when present it is placed on the longus colli, over the fifth or sixth cervical vertebræ; *the superior* filaments from this ganglion ascend and join the superior cervical ganglion; *the inferior* descend, and are united to the infer ganglion; *the external* filaments cross the scaleni muscles, and anastomose with the phrenic, fourth, fifth, and sixth cervical nerves; *the internal* filaments form, on the thyroideal artery, the thyroideal plexus, and are connected with the recurrent lacryngeal nerve; *the anterior* filaments give off the middle cardiac nerve, and also unite with the superficial cardiac.

*The inferior (ganglion cervicale inferius)* is placed on the transverse process of the seventh cervical vertebra, on the neck of the first rib, behind and below the vertebral artery; *the superior filaments* join the middle cervical ganglion, and form around the vertebral artery the vertebral plexus, which gives off twigs corresponding to the distribution of that vessel; *the inferior filaments* are united to the first thoracic ganglion; *the external filaments* are distributed to the scaleni, and communicate with the three last cervical and first dorsal nerves; *the internal filaments* are numerous, supply the longus colli, anastomose with the recurrent laryngeal, and assist in forming the pulmonary plexus; *the anterior filaments* constitute the inferior cardiac nerves.

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## OF THE CARDIAC NERVES.

The Cardiac Nerves are three in number, but are not similar in arrangement on both sides; they are united to the cardiac ganglion. *The superior cardiac nerve* is formed by four or five branches from the superior cervical ganglion; it descends along the outer margin of the common carotid on the right side, enters the chest behind the subclavian vein, and joins the middle cardiac nerve; on the left side at the lower part it



descends between the common carotid and subclavian artery, and unites with the inferior cardiac nerve and cardiac ganglion. Both these nerves *anastomose* with the carotid, and inferior thyroideal plexus, with the pneumo-gastric, ninth pair, and recurrent laryngeal nerves. *The middle cardiac nerve*, on the right side, commences by numerous filaments from the middle cervical ganglion; they unite and form one trunk, which descends on the outer side of the common carotid in front of the subclavian artery, and terminates behind the aorta in the cardiac ganglion. *On the left side the middle cardiac is wanting.* *The inferior cardiac nerve* arises on the right side, from the inferior cervical ganglion it descends behind the subclavian, in front of the aorta, and *joins* the anterior *conorary plexus*; on the left side it is formed by a filament from the middle and inferior cervical ganglion, and joins the cardiac ganglion.

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## THE CARDIAC GANGLION, OR PLEXUS.

*The Cardiac Ganglion* is situated between the arch of the aorta and division of the trachea; it presents the appearance of a soft pellucid ganglion, of irregular shape of a grey colour, and is principally formed by the *right middle and left inferior* cardiac nerves. Filaments of the left superior and right inferior cardiac also join the plexus. It gives off *anterior branches*, distributed to the anterior parieties of the aorta; *posterior filaments* to the pulmonary and œsophageal plexuses; *inferior filaments*, which are numerous, of pulpy gelatinous structure, and are distributed to the aorta and pulmonary vessels, freely *anastomosing* with the *nervus vagus*.

From these filaments are derived the anterior and posterior coronary plexus; the anterior filaments pass in front of the aorta, pulmonary artery, and descending vena cava, to the base of the heart, and uniting with the right inferior cardiac nerve, accompany the anterior coronary artery through all its divisions, constituting the anterior coronary plexus, and follow the division of that artery through the substance of the heart.

*Right side.*

*Ramus cardiacus superior*, joins the middle cardiac branch.

*Ramus cardiacus medius*, joins the cardiac ganglion.

*Ramus cardiacus inferior*, joins the anterior coronary plexus.

*Left side,*

*Ramus cardiacus superior*, joins the inferior cardiac and cardiac ganglion.

*Ramus cardiacus medius*, wanting.

*Ramus cardiacus inferior*, unites with a filament from the middle ganglion, and joins the cardiac ganglion.

## OF THE THORACIC PORTION AND GANGLIA.

*The thoracic portion of the Trunk* extends from the first rib to the diaphragm, presents twelve small ganglia of triangular shape, united to each other by branches so as to form a continued nervous trunk; they are placed behind the pleura, in front of the heads of the ribs; the first thoracic ganglion is the largest. They give off external and internal branches—the former are united with the anterior filaments of the dorsal nerves, the latter pass inwards over the vertebral column within the posterior mediastinum, and join the pulmonary and œsophageal plexus. Bichat and Chaussier have pointed out one branch in particular, coming off from the tenth ganglion, and, descending with the aorta, enters the abdomen to terminate in the celiac plexus. From the inner side of the inferior ganglia are given off the splanchnic nerves.

## THE GREATER SPLANCHNIC NERVE.

*The greater Splanchnic Nerve* arises by distinct branches from the sixth, seventh, eighth, ninth, and

tenth ganglia, they unite on the body of the tenth dorsal vertebra, and form a single trunk which descends, and enters the abdomen between the pillars of the diaphragm and joins the cæliac ganglion.

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### THE SMALLER SPLANCHNIC NERVE.

*The smaller Splanchnic Nerve* is composed of two branches, coming off from the tenth and eleventh thoracic ganglia, which unite on the body of the twelfth dorsal vertebra, enter the abdomen between the pillars of the diaphragm, external to the greater nerve, the trunk thus formed divides into two filaments, communicating with the preceding nerve, with the solar plexus, and terminates in the renal plexus.

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### SEMILUNAR GANGLION.

*The Semilunar Ganglions* have been considered the centre of the ganglionic system, as the largest in the whole body; in shape irregular, flat, concave above, convex below; they lie upon the crura of the diaphragm, aorta, above and behind the supra renal capsule, and on either side the cæliac axis. They communicate freely with each other, by numerous filaments, and form with branches from the nervus vagus an intricate plexus, the solar plexus, interspersed with numerous small ganglia.

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### SOLAR PLEXUS.

*The Solar Plexus* is situated behind the stomach, above the pancreas, in front of the aorta, and pillars of the diaphragm; it surrounds the cæliac axis, and gives off the following secondary plexuses, viz. (1) *The phrenic plexus* which accompanies the diaphragmatic arteries, and is distributed to the diaphragm, and anastomoses with the phrenic nerves. (2) *The cæliac plexus* which

embraces the trunk of the cæliac artery, and sends off filaments corresponding in their distribution to the divisions of that artery, viz. *coronary plexus*, which accompanies the coronary artery along the smaller curvature of the stomach, and unites with the pneumo-gastric nerves, and is distributed to the stomach, and also to the liver. The *anterior hepatic plexus* which is much larger, and passes to the sulcus transversus of the liver, is distributed to the liver, pancreas, and duodenum, and unites with filaments from the right pneumo-gastric nerve. Lastly, the *splenic plexus* which proceeds to the spleen supplies that viscus, and the pancreas and stomach, and *anastomoses* with the left pneumo-gastric nerve. The posterior hepatic plexus is derived from the right semilunar ganglion, and follows the course of the ascending vena cava. Next, (3) *superior mesenteric plexus*, which descends between the pancreas and transverse portion of the duodenum, between the layers of the mesentery, and accompanies the branches of the superior mesenteric artery, to the small intestines, cæcum, ascending and transverse colon. (4) *Inferior mesenteric plexus*, which might be considered as continuous with the superior; it passes in front of the aorta, and is joined by filaments from the renal, spermatic plexus, and lumbar ganglia; it divides into branches to the descending and sigmoid flexure of the colon, to the rectum, communicating with the hypogastric plexus, and into filaments distributed to the hypogastric vessels, some of which may be traced in company with the external iliac artery, as far as the thigh: (5) *renal plexus*, which receives branches from the semilunar ganglions, from the small splanchnic nerves, from the inferior mesenteric plexus, from the lumbar ganglia, and is distributed to the kidney: (6) *the spermatic plexus*, which follows the course of the spermatic artery, and in the male is distributed to the testis, in the female to the ovary—all these plexuses are interspersed with numerous small ganglia.

Semilunar ganglion gives off the solar plexus.

Solar plexus gives off the following plexuses :—

(1) Phrenic plexus

(2) Cæliac plexus	from whence are derived	{ Coronary plexus Hepatic plexus Splenic plexus
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(3) Superior mesenteric  
plexus

(4) Inferior mesenteric  
plexus

(5) Renal plexus

(6) Spermatic plexus

## LUMBAR PORTION & LUMBAR GANGLION.

*The Lumbar Portion of the Trunk* extends from the ligamentum arcuatum to the base of the sacrum; it is situated on the lateral and anterior part of the bodies of the lumbar vertebræ; on the *right side* behind the vena cava; on the *left* behind the aorta, and offers four or five ganglia. They communicate with each other by numerous filaments, with the anterior branches of the lumbar nerves, and form a plexus around the aorta, the *aortic plexus*, from which filaments proceed to the inferior mesenteric and hypogastric plexuses.

## THE SACRAL PORTION AND SACRAL GANGLIA.

*The Sacral Portion of the Trunk* lies upon the anterior surface of the sacrum, and presents four ganglia; at the inferior part of the sacrum the two nerves terminate, unite, and form an arch—the convexity towards the os coccygis. The ganglia are joined to each other, and with the anterior branches of the sacral nerves by numerous filaments, and also assist in forming the hypogastric plexuses

## THE HYPOGASTRIC PLEXUS.

*The Hypogastric Plexus* is placed between the sacrum and rectum; it receives filaments from the aortic, inferior mesenteric, and sciatic plexuses, and is distributed to the rectum and its muscles, to the bladder, vesiculæ seminales in the male, to the uterus and the vagina in the female.

From the distribution of this important system we can readily explain the great sympathy which exists between every part of the wonderful machine—the human frame.









## PLATE I.

### SPINAL NERVE.

(From Bell.)

FIGURE I.

1. Medulla spinalis
2. Posterior root and ganglion for sensibility
3. Anterior root for motion
4. Compound nervous trunk, endowed with the function of motion and sensation

### RESPIRATORY NERVES.

FIGURE II.

5. Tractus respiratorius
- 1 & 2. Glosso-pharyngeal nerve (~~nervus~~ glosso-pharyngeus respiratorius)
3. Nervus vagus (nervus pneumo-gastricus respiratorius)
4. Spinal accessory nerve (nervus trachelo dorsalis respiratorius).
6. Sub-occipital nerve, or first cervical, arising by double roots, possessing ganglia, and endowed with the double function of sensation and motion
7. Second cervical nerve.
- ▲. Spinal ganglion.
- ▲. Spinal ganglion.

## PLATE II.

## RESPIRATORY NERVES,

(From Bell.)

- A. Sterno-cleido-mastöideus
- B. Trapezius
- C. Scapula
- D. Clavicle
- E. E. Serratus magnus
- F. Lower surface of the diaphragm
- G. Upper surface of the diaphragm
- 1. Portio dura of the seventh pair, (respiratory nerve of the face) (*nervus respiratorius faciei*)
- 2. Glosso-pharyngeal nerve, (respiratory nerve of the tongue and pharynx) (*nervus respiratorius glosso-pharyngeus*)
- 3. Superior respiratory nerve
- 4. Phrenic nerve (*nervus respiratorius into-thoracicus*)
- 5. External respiratory nerve, (*nervus respiratorius exto-thoracicus*)
- 6 & 7. Nervus vagus (*nervus respiratorius pneumo-gastricus*)
- 8. Superior laryngeal nerve, from the nervus vagus
- 9. Recurrent laryngeal nerve, from the nervus vagus

## PLATE III.

## FIFTH PAIR.

(From Lauth.)

- 1. Trunk of the fifth pair
- 2. Ganglion, formed by posterior filaments
- 3. Anterior filaments uniting with the posterior, to form the inferior maxillary nerve.
- 4. The sixth pair of nerves with its carotid branch



A. S  
B. T  
C. S  
D. C  
E. E  
F. L  
G. U  
1. P

2. G

3. S

4. P

5. E

6 &

8. S

9. R

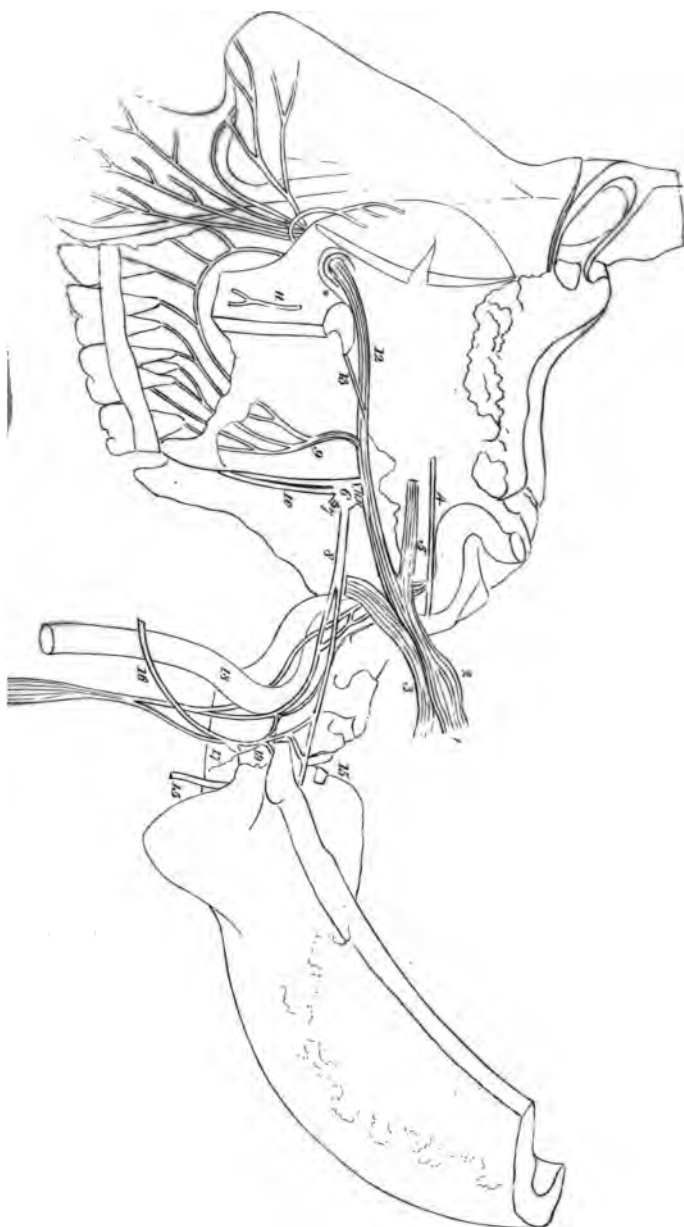
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6. Ophthalmic nerve (first division of the fifth)
7. Mekel's ganglion, or sphenopalatine
8. Sphenopalatine nerves
9. Vidian nerve giving off superior petrosal branch and inferior petrosal, joining the carotid ganglion
10. Posterior dental nerves
11. Posterior palatine nerves
12. Malar filament
13. Superior maxillary nerve, continued to form the infra orbital nerve, (2nd. division of the fifth)
14. Orbital branch
15. Superior cervical ganglion of the great sympathetic
16. Portio dura, or facial nerve
17. Glosso-pharyngeal nerve
18. Glosso-pharyngeal ganglion
19. Carotid artery
20. Ramus anastomoticus of Jacobson, from the glosso-pharyngeal ganglion.

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## P L A T E I V .

### FIFTH PAIR OF NERVES.

*(From Cloquet.)*

1. Trunk of fifth pair of nerves
2. Ophthalmic nerve (first division of the fifth pair of nerves)
3. Superior maxillary nerve (second division of the fifth)
4. Inferior maxillary nerve (third division of the fifth)
5. Frontal branch
6. Ethmoidal and nasal branch
7. Lacrymal branch
8. Trunk of the superior maxillary nerve, above the pterygo-maxillary fossa
9. Trunk of the same nerve, in the infra orbital canal
10. Temporal filament
11. Malar filaments (from second division)
12. Superior dental branches
13. Posterior dental branches



14. Mekel's ganglion, with vidian nerve passing backwards, and palatine nerves descending in the pterygo-maxillary fossa
15. Filaments from Mekel's ganglion, to the superior maxillary nerve
16. Superior branch from the inferior maxillary nerve (third division of the fifth)
17. Branch to the buccinator muscle
18. Inferior maxillary nerve
19. Corda tympani
20. Auricular branch
21. and 22. Lingual nerve
23. Inferior dental nerve
24. Submental branch
25. Submaxillary plexus
26. Mylo-hyoid branch

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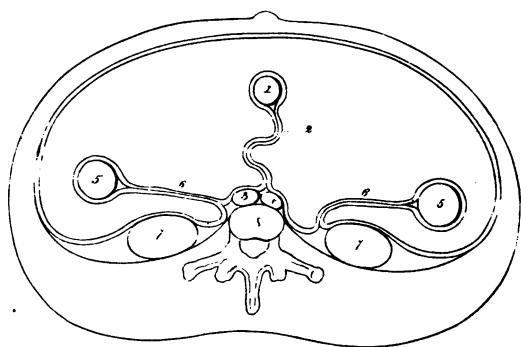
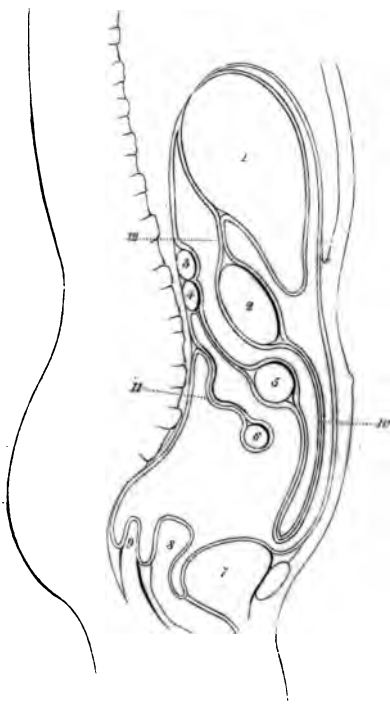
## P L A T E V.

(*From Lauth.*)

1. The liver.
2. The stomach
3. Duodenum
4. Pancreas
5. Transverse arch of the colon
6. Small intestines
7. Bladder
8. Uterus
9. Rectum
10. Great omentum (epiploon gastro-colique)
11. Little omentum (epiploon gastro-hepatique)
12. Mesentery









## ERRATA.

### PAGE

- 2 *pro* os frontis, *lege* ossa frontis.  
 4 *pro* depression, *lege* and eminence (*tuber superciliare*).  
 5 *ad* connexions of os frontis, *adde* os ethmœideum.  
 7 *ad* foramina lacera basis cranii, *adde* accessory nerves.  
 9 and 24 *pro* eustachii, et glasseri, *lege* Eustachii et Glasseri.  
 14 *pro* quatuor, *lege* quatuor.  
 15 *pro* orbitalia, *lege* orbitalis.  
 21 *pro* iiii. iv. *lege* iv. v. *et adde* infra surround the lacrymal bones  
 22 *pro* orbital, *lege* orbital—*pro* principle, *lege* principal.  
 23 *pro* Follopii, *lege* Fallopii—*pro* crani, *lege* crani.  
 150 *pro* vertebræ, *lege* vertebra.  
 158 *pro* tri-femoro-retularis, *lege* tri-femoro-rotularis.  
 160 *pro* gracialis, *lege* gracilis.  
 166 *pro* tendo Achilles, *lege* tendo Achillis.  
 167 *pro* tibio calcaneous, *lege* tibio calcaneus.  
 177 *pro* relax, *lege* relaxed.  
 178 *pro* cura, *lege* crura.  
 180 *pro* attolens, *lege* attollens.  
 185 *pro* to increase, *lege* increase—*pro* dori, *lege* dorsi  
 193 and 199 *pro* eight pair, *lege* eighth pair.  
 194 *pro* thyraideal, *lege* thyroideal.  
 196 *pro* arteria glandulares, *lege* arteria glandularis.  
 202 *pro* meduis, *legi* medius.  
 204 *pro* inferieme, *lege* inferieure.  
 216 *pro* pericardic, *lege* pericardiac.  
 217 *pro* artery, *lege* arteria.  
 218 *pro* sphenic, *lege* splenic.  
 219 *pro* ileo-colic, *lege* ilio-colica.  
 220 *pro* albriginea, *lege* albuginea.  
 226 *pro* cural, *lege* crural nerve.  
 229 *pro* perforates, *lege* perforantes.  
 252 *pro* thoracica, *lege* thoracici—*pro* cieritious, *lege* cineritious.  
 275 *pro* spinate, *lege* spinati.  
 292 *pro* nervi intercostalis, *lege* nervi intercostales.  
 296 *pro* aqua, *lege* aquæ—*pro* form, *lege* forms—*pro* accompanies,  
     *lege* accompany.  
 299 *pro* infer, *lege* inferior.

